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PROPELLANT SURVEILLANCE REPORT LGM-30 F AND G STAGE I. PHASE E,--ETC(U)  
JUN 78 J A THOMPSON

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OGDEN AIR LOGISTICS CENTER

UNITED STATES AIR FORCE

HILL AIR FORCE BASE, UTAH 84406

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PROPELLANT  
SURVEILLANCE REPORT  
LGM-30 F&G STAGE 1  
PHASE E, SERIES V

TP-H 1011

PROPELLANT LABORATORY SECTION

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JUNE 1978

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MMWRM PROJECT M82934C-WNL17514

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PROPELLANT SURVEILLANCE REPORT  
LGM-30 F & G STAGE I, (TP-H1011).

and

Phase E, Series V.

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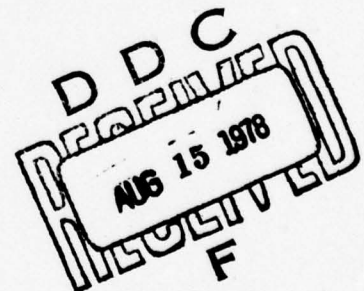
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June 1978

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## ABSTRACT

This report contains propellant test results from cartons of TP-H1011 bulk propellant representing LGM-30 F and G First Stage Minuteman Motors. This report uses a statistical approach to analyze the bulk carton propellant data. Testing was accomplished in accordance with MMWRM Project M82934C-WNL17514.

The data from this test period are combined with data from previous testing and entered into the G085 computer for storage, analysis and regression analysis. From the statistical analysis of all data tested to date (thirteen years for F and G), significant degradation of the propellant does not appear likely for at least two years past the oldest data point.

Each point on the regression plot represents the mean of all samples at that particular age. The number of samples at each point is indicated on the sample size summary sheet on the page accompanying each regression plot or group of regression plots. The data range at any age can be found by suitable inquiry of the G085 system.

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29A	Test Report (Missile in silo)	13 Jan 64
29B	Zero Time Test Results	29 Jan 64
29C	Zero Time Test Results (Supplement 1)	30 Mar 64
29D	Zero Time Test Results (Aft Closure)	9 Jun 64
29E	Zero Time (Aft Closure Supplement 1)	24 Jun 64
29F	ATP Phase I Test Results	30 Mar 65
29G	ATP Phase I Test Results	19 Aug 65
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66	ATP Phase I, Wings II-V (Sixth Group)	22 Jul 66
76	ATP Phase II, Wing I Test Results	24 Jan 67
78	Zero Time, Wing VI Test Results	3 Feb 67
104	ATP Phase I, Wing VI (First Group)	12 Oct 67
118	ATP Phase II, Wings II-V (First Group)	5 Mar 68



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288	Propellant Surveillance Report LGM-30 A & B, Stage I, TP-H1043	Mar 74
290	Propellant Surveillance Report LGM-30 F & G, Stage I, Phase B, Series I TP-H1011	Mar 74
300	Minuteman Stage I Motor Reliability Improvement Program Surveillance	May 74

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<u>Report Nr</u>	<u>Title</u>	<u>Report Date</u>
302	Propellant Surveillance Report LGM-30	Nov 74
313	Stage 1 Propellant Surveillance Report, Propellant Containing Glacial Acrylic Acid	Oct 74
315	Propellant Surveillance Report LGM-30 F & G Stage 1, TP-H1011	Jan 75
316	Propellant Surveillance Report LGM-30 A & B Stage 1, TP-H1011	Feb 75
319	Propellant Surveillance Report LGM-30 Dissected Motors, Phase VI, TP-H1011	Apr 75
321	Propellant Surveillance Report LGM-30 F & G Stage 1, Phase B, Series II, TP-H1011	Apr 75
325	Propellant Surveillance Report LGM-30 A & B Stage 1, TP-H1011	Jun 75
328	Propellant Surveillance Report LGM-30 A & B Stage 1, TP-H1011	Sep 75
330	Propellant Surveillance Report LGM-30 F & G Stage 1, TP-H1011	Oct 75
335	Stage 1 Motor Reliability Improvement Program	Dec 75
337	Propellant Surveillance Report LGM-30 A & B, Stage 1, TP-H1043	Feb 76
339	Stage 1, New MAPO & ERL-510 Qualification	Mar 76
341	Propellant Surveillance Report LGM-30 Dissected Motors, Phase VII, TP-H1011	Mar 76

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343	Propellant Sureveillance Report LGM-30 A & B, Stage 1, TP-H1011	Jun 76
345	Propellant Surveillance Report LGM-30 F & G, Stage 1 Phase B, Series III, TP-H1011	Jun 76
350	Qualification of a New MAPO Source and ERL-510 Curing Agent for Minuteman, Stage 1, UF-2121 Liner	Sep 76
351	Propellant Surveillance Report LGM-30 A & B, Stage 1, TP-H1011	Sep 76
354	Minuteman Stage 1 Motor Reliability Improvement Program Surveillance	Sep 76
358	Propellant Surveillance Report LGM-30 Dissected Motors, Phase VIII, TP-H1011	Oct 76
360	Propellant Surveillance Report LGM-30 F & G, Stage 1 Phase E, Series III, TP-H1011	Nov 76
367	Propellant Surveillance Report LGM-30 A & B, Stage 1, TP-H1011	Apr 77
370	Propellant Surveillance Report LGM-30 F & G, Stage 1, Phase E, Series II, TP-H1011	Apr 77
377	Qualification of a New MAPO Source and ERL-510 Curing Agent for Minuteman Stage 1, UF-2121 Liner	Oct 77
379	Final RIP Report, Minuteman Stage 1 Motor Reliability Improvement Program Surveillance	Oct 77
385	Propellant Surveillance Report LGM-30 A, B, F, & G, Stage 1, TP-H1043	Dec 77
388	Propellant Surveillance Report LGM-30 A & B Stage 1, TP-H1011	Jan 78
390	Propellant Surveillance Report LGM-30 F & G Stage 1, Phase E, Series IV, TP-H1011	Feb 78
392	Propellant Surveillance Report LGM-30 Dissected Motors, Phase IX, TP-H1011	Mar 78
393	Propellant Surveillance Report LGM-30 A & B Stage I, TP-H1011	May 78



## GLOSSARY OF TERMS AND ABBREVIATIONS

Aging Trend	A change in properties or performance resulting from aging of material or component
CSA	Cross Sectional Area
DB	Dogbone
Degradation	Gradual deterioration of properties or performance
E	Modulus (psi), defined as stress divided by strain along the initial linear portion of the curve.
EB	End Bonded
EGL	Effective Gage Length
em	Strain at maximum stress
er	Strain at rupture
"F" ratio	The ratio of the variance accounted for by the regression function to the random unexplained variance. The regression function having the most significant "F" ratio is used for plotting data. The ratio is also used in detecting significant changes in random variation between succeeding time points
JANNAF	Joint Army, Navy, NASA, Air Force Committee
MANCP	Propellant Lab Section at Ogden Air Logistics Center
Ogden ALC	Ogden Air Logistics Center, Air Force Logistics Command
r or R	The Correlation Coefficient is a measure of the degree of closeness of the linear relationship between two variables
Linear Regression Equation	The general form of the linear regression equation is $Y = a + bx$
Regression Line	Line representing mean test values with respect to time
$S_b$	Standard error of estimate of the regression coefficient

# GLOSSARY OF TERMS AND ABBREVIATIONS (cont)

$S_e$ or $S_{y.X}$	Standard deviation of the data about the regression line
$S_m$	Maximum Stress
$S_r$	Stress at rupture
Standard Deviation ( $S_y$ )	Square root of variance
Strain Rate	Crosshead speed divided by the EGL
"t" test	A statistical test used to detect significant differences between a measured parameter and an expected value of the parameter (determines if regression slope differs from zero at the 95% confidence level)
Variance	The sum of squares of deviations of the test results from the mean of the series after division by one less than the total number of test results
3 Sigma Band	The area between the upper and lower 3 sigma limit. It can be expected that 99.73% of the inventory represented by the test samples would fall within this range assuming that the population is normally distributed.
90-90 Band	It can be stated with 90% confidence that 90% of the inventory represented by the test samples would fall within this range assuming that the population is normally distributed

## INTRODUCTION

### A. PURPOSE:

Laboratory testing has been performed for thirteen years on First Stage LGM-30 F and G Minuteman Motor propellant blocks to evaluate the effects of aging on TP-H1011 propellant. This report contains those tests conducted on propellant as instructed in MMEMP Test Directive GTD-1C, Amendment 2, LGM-30 First Stage Operational Propellant Laboratory Testing.

Statistical analysis of the data from tests performed will provide early warning if serious degradation trends develop. Annual evaluation of the propellant provides data for input into engineering reliability analysis for service life predictions.

### B. BACKGROUND:

LGM-30 F and G testing was started in 1966 with phase testing at 24 month intervals (Report Numbers 78 - zero time; 104, 162, 185-Phase I; 176, 239, 257-Phase II; 271-Phase III). Report Number 257 was the first time that LGM-30 F and G data were statistically analyzed separately from LGM-30A and B data. The present report is a continuation of testing and statistical analysis.

Zero time testing for LGM-30A, B, F and G was started as soon as possible after receipt of the propellant by MANCP. Data from these tests were used to establish a base line for each test parameter.



The LGM-30F and G propellant test matrix (Table 1) is used to determine the number of specimens to be taken from each propellant loaf and the specific test or tests to which these specimens are to be subjected. Very low rate and low rate tensile specimens are taken on all LGM-30F and G blocks. Specimens for other physical and combustion tests are taken from every third (LGM-30F and G) block.

TABLE 1

## SAMPLE PLAN

The Procedure for determining tests to be performed on propellant batch samples of IGM-30 F & G First Stage Motors are as follows:

1. Divide the USAF motor serial numbers into three groups by dividing the last three digits of each serial number by three to determine the remainder integer, e.g.,  $154 \div 3 = 51$  with a remainder integer of 1.
2. Use the remainder integer to enter the following matrix to determine the group of tests to be performed on the forward, middle, and aft batch samples associated with a particular motor serial number.

GROUP MATRIX			
TP-H1011 PROPELLANT BATCH SAMPLE	GROUP I	GROUP II	GROUP III
Forward	1	2	0
Middle	0	1	2
Aft	2	0	1

Each group will receive the following tests:

TEST MATRIX			
GROUP I	GROUP II	GROUP III	
High Rate Triaxial	Dynamic Response	High Rate Hydrostatic	
Creep	Stress Relaxation	Sol Gel	
Biaxial Low Rate	Burning Rate	DSC	
TCLC	Heat of Explosion	TGA	
Hardness	Pressure Time	DTA	
Ignitability		Impact	

NOTE: Low Rate and Very Low Rate Tensile tests are performed on all blocks.

## STATISTICAL APPROACH

In order to determine aging trends for shelf/service life predictions, as directed by Service Engineering, First Stage LGM-30 F and G Minuteman TP-H1011 propellant blocks have been undergoing testing since 1966, statistically analyzed and reported on a regular test cycle by this laboratory.

The primary reason for performing statistical analysis on test data is for the detection of propellant changes due to aging that would affect motor reliability. Regression analysis was the method used to examine data and to aid in drawing conclusions about dependency relationships that may exist i.e., relationship between age versus test results.

In selecting the best fit model for the regression equation, the linear model  $Y = a + bX$  was found to be the best fit model for 96% of the regression plots. The model used is shown in the regression equation at the top of every regression plot and those which are not linear will also be listed and discussed in the test results section.

Individual data points from different time periods were used to establish a least squares trend line for the data. The variance about the regression line, obtained using individual values of the dependent variable, was used to compute a tolerance interval such that at the 90% confidence level 90% of the sample distribution falls within this interval. This tolerance interval was extrapolated to a maximum of 24 months into the future from age of the oldest motor tested. The 't' value and the



significance of this statistic, which are reported for each regression model, give an indication of the "statistical significance" of the slope of the trend line as compared to a line of zero slope. Data were plotted by computer. The 'y' axis is computed so that the values at one inch intervals are peculiar to the data spread of the parameter tested. Plotted data points represent means at the particular ages at which testing occurred. The number of specimens at each age point is indicated on the sample size summary sheet accompanying the regression plot. Variance at each test age can be determined by consulting the G085 data storage system.

In comparing the present regression slopes and Y intercepts with previous slopes and intercepts, it is noted that more of the aging trend lines have become flatter or closer to a line of zero slope which indicates less change due to age.

A post cure effect (propellant stabilizing after the first year or two) has been observed on some of the early test data (stress relaxation at -65°F, -40°F, and 20°F; TGA percent weight loss at 250°C; DTA exotherm 1, and exotherm 2); which tended to bias and skew the projected trend lines. To overcome this factor, two methods of analysis were performed: First, where possible, non-linear models were used that would best fit the total data (TGA % weight loss at 250°C, DTA exotherm 1 and exotherm 2 data); second, where non-



linear models did not fit the data as good as the linear model this early data was eliminated (Stress Relaxation at  $-60^{\circ}\text{F}$ ,  $-40^{\circ}\text{F}$ , and  $20^{\circ}\text{F}$  data). By compensating for this post cure biasing a more accurate aging trend line for service life prediction is provided.

## TEST RESULTS

### VERY LOW RATE TENSILE:

Very low rate regressions show no significant change for strain at maximum stress with strain at rupture showing a statistically significant decrease. The stresses and modulus show a statistically significant increase (Figure 1 thru 5). The trends are gradual for the respective regressions and no operational problems from the propellant are expected for at least two years beyond the last test date.

### LOW RATE BIAXIAL TENSILE:

Although the trend line approaches a line of zero slope, the strain regressions show a statistically significant decrease. The stresses and modulus show a statistically significant increase (Figures 6 thru 10).

### LOW RATE TENSILE:

Low rate tensile data regressions show a statistically significant gradual decrease for strains and a statistically significant increase for stresses and modulus (Figures 11 thru 15).

### HIGH RATE TRIAXIAL TENSILE:

The strain at maximum stress, strain at rupture and modulus regressions show a statistically significant decrease. Maximum stress and stress at rupture do not show a significant change (Figures 16 thru 20).

#### HIGH RATE HYDROSTATIC TENSILE:

The strains show a statistically significant decrease and the stresses show a statistically significant increase. The modulus did not show a significant change (Figures 21 thru 25).

#### TENSILE SUMMARY:

The test data regressions show that the strain is gradually decreasing and the stress and modulus gradually increasing.

Based on the analysis of test data regressions, it does not appear that meaningful degradation is occurring at this time and no operational problems are expected in the propellant for at least two years beyond the last data point.

#### STRESS RELAXATION MODULUS:

For the 0.5% strain at -65°F, the regressions for data at 10, 50 and 100 seconds show a statistically significant gradual increase with the 1000 second regression showing no significant change (Figures 26 thru 29).

At -40°F, the 10 second regression shows no significant change while the 50, 100 and 1000 second regressions show a statistically significant decrease (Figures 30 thru 33).

The 3% strain regressions at 20°F, 77°F, 100°F, 140°F, and 180°F show a statistically significant gradual increase except for the 20°F at 10 second regression which does not show a change (Figures 34 thru 53).

#### SOL GEL:

The percent extractables and density do not show a significant change. Gel swell ratio and crosslink density regressions show a statistically significant increase (Figures 54 thru 57).

#### CONSTANT STRAIN:

A statistically significant gradual decrease is shown for constant strain (Figure 58).

#### HARDNESS:

Shore A ten second hardness shows a statistically significant increase (Figure 59).

#### SUMMARY OF SOL GEL, TENSILE AND HARDNESS DATA:

The crosslink density, constant strain and hardness data regressions correlate with the tensile data. As the polymer continues to crosslink, the strains decrease and the stresses and hardness increases.

#### BURNING RATE:

The burning rate regression shows a statistically significant gradual decrease (Figure 60).

#### PRESSURE TIME:

Maximum pressure and time to maximum pressure shows a statistically significant gradual decrease (Figures 61 and 62).

#### IGNITABILITY:

Time to ignition shows a statistically significant gradual increase (Figure 63).

#### TCLE (Thermal Coefficient of Linear Expansion)

The thermal coefficient of linear expansion for both above and below



the glass transition point ( $T_g$ ) shows a statistically significant gradual increase (Figures 64 and 65).

#### TGA (Thermal Gravimetric Analysis):

A statistically significant increase is shown for the ignition temperature ( $9^\circ\text{C}$  rise/min) and the percent weight loss at  $250^\circ\text{C}$  hold ( $12^\circ\text{C}$  rise/min to hold) with the weight loss at ignition showing no significant change (Figures 66 thru 68). The model  $Y = a + b\left(\frac{1}{x}\right)$  was found to better represent the data than the linear model in Figure 67.

#### DTA (Differential Thermal Analysis):

The endotherm and first and second exotherms show a statistically significant decrease. The third exotherm and ignition temperature shows a statistically significant increase (Figures 69 thru 73). The model  $Y = a + b (\text{LOG } X)$  was found to better represent the data on Figures 70 and 71 than the linear model.

#### THERMAL AND COMBUSTION SUMMARY:

The thermal and combustion regressions show good correlation. The burning rate, time to maximum pressure, ignition time for ignitability, TGA and DTA are all increasing.

#### TEAR ENERGY:

This is the first time that sufficient data were available for preparation of a tear energy regression on Wing 6 propellant.

The regression shows a statistically significant gradual decrease (Figure 74).

#### FAILURE ENVELOPE:

The failure envelope is shown in Figure 75.

## CONCLUSIONS

Thirteen years of aging at ambient temperature (77°F) has not greatly changed the properties of the propellant. Some test parameters indicate slight aging trends, but nothing that would adversely affect the operational characteristics of the rocket motor propellant.

From the statistical analysis, it does not appear that significant propellant degradation is occurring. Based on the thirteen years of accumulated data, there is no reason to suspect that properties will show much change for at least two years past the last data point. Therefore, propellant reliability should not change appreciably over that time period. Since failure limits are not available for the parameters tested, this statement is based on the fact that the slope of the regression curves where statistically significant are, with few exceptions, relatively flat or close to the line of zero slope and have not changed appreciably from the last test period.

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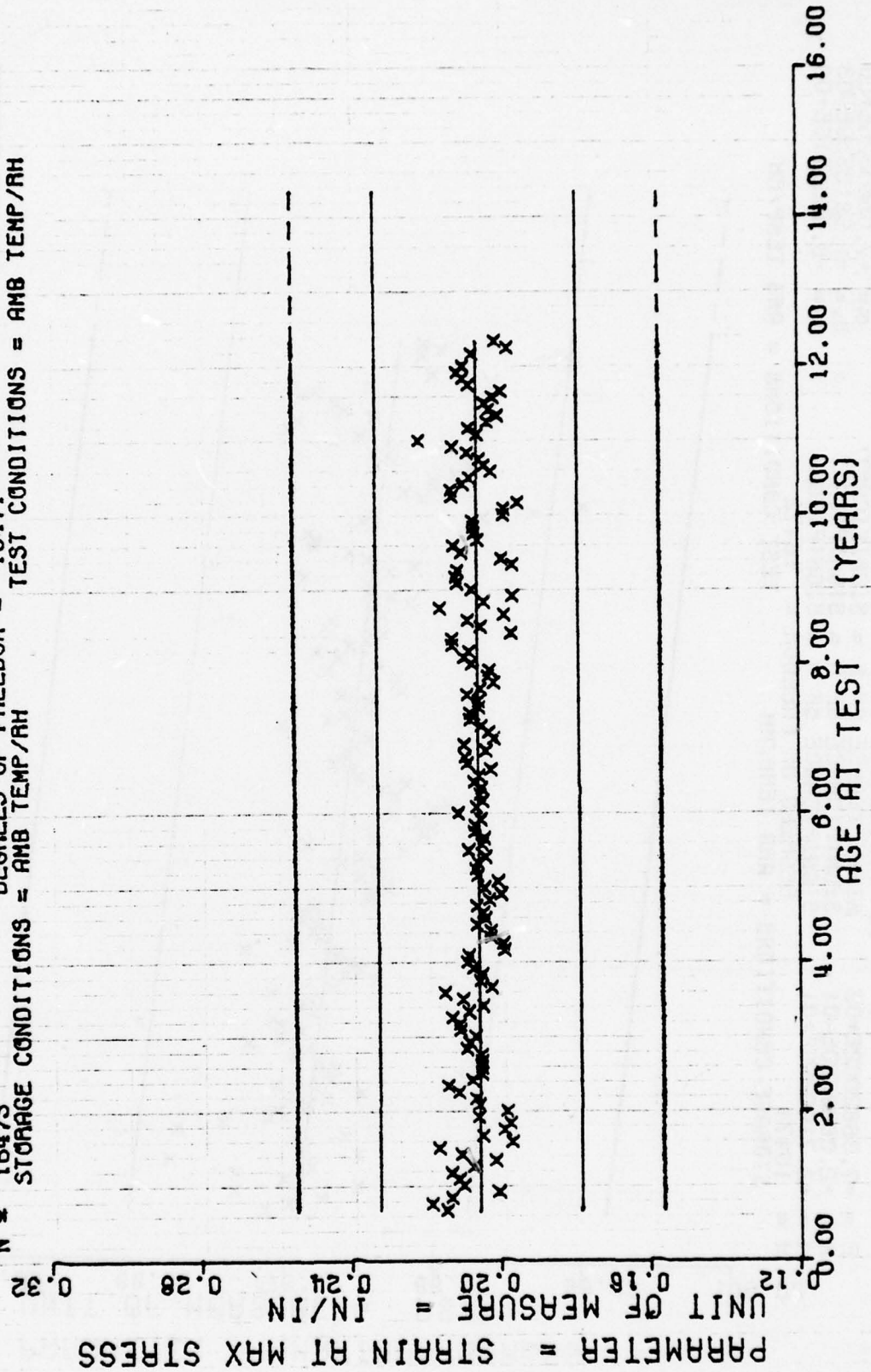
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WING 6.V,L,R,T,FNSILE,MAXIMUM STRESS,CHS=0,002 IN/MIN TP-H1011

This sample size summary is applicable to figures 1 thru 3 and 5.



$Y = ((+2.053388E-01) + (+4.0751842E-06) * X)$   
 $F = +1.1592532E+00$  SIGNIFICANCE OF F = NOT SIGNIFICANT  $\sigma = +1.6419172E-02$   
 $R = +8.3890714E-03$  SIGNIFICANCE OF R = NOT SIGNIFICANT  $S_e = +3.7849320E-06$   
 $t = +1.0766862E+00$  SIGNIFICANCE OF t = NOT SIGNIFICANT  $S_t = +1.6419092E-02$   
 $N = 16473$  DEGREES OF FREEDOM = 16471  
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = AMB TEMP/AH

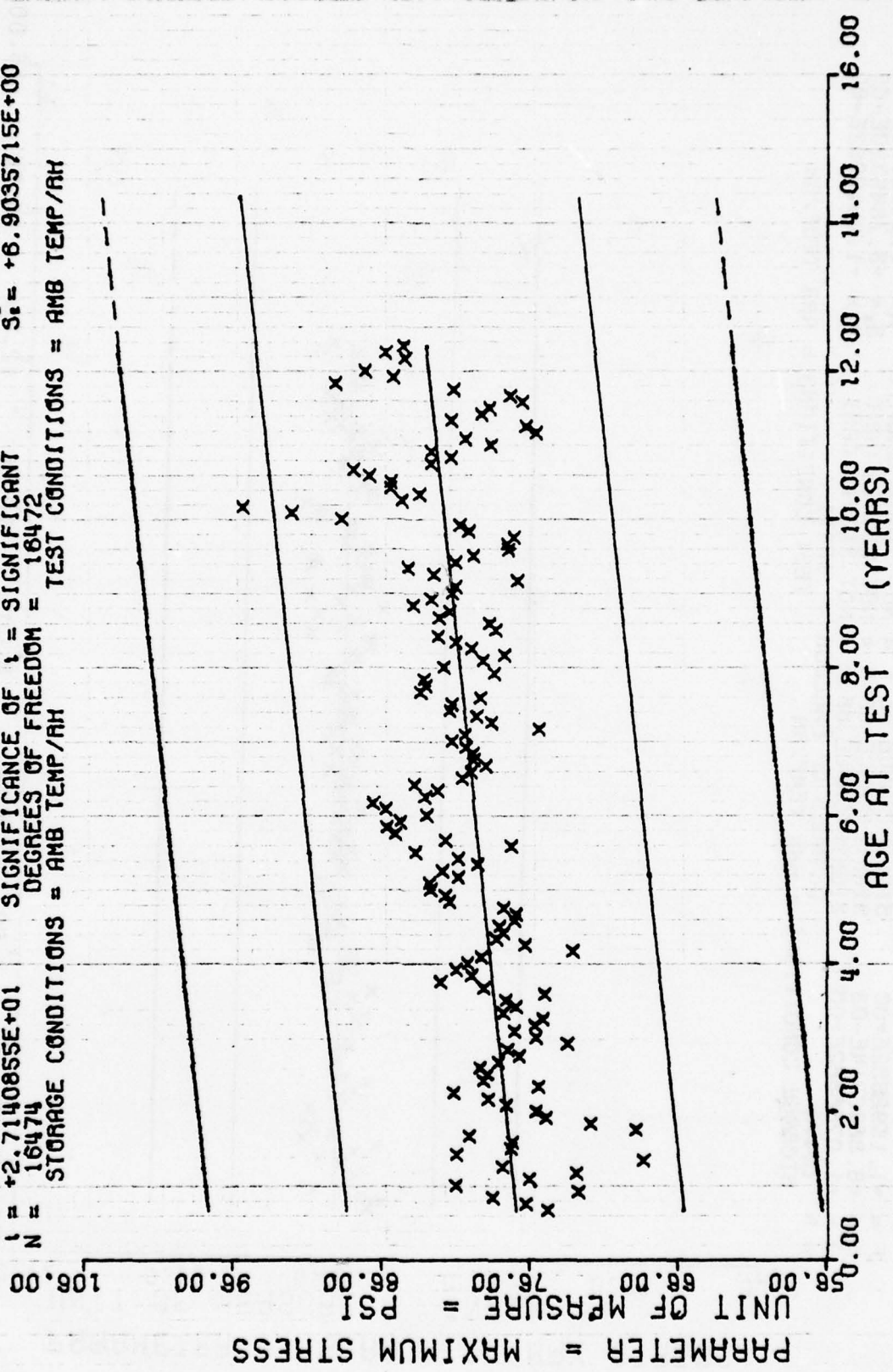


WSNG 6.V.L.R. TENSILE, STRAIN AT MAX STRESS, CHS=0.002 IN/MIN TP-H1011

Figure 1



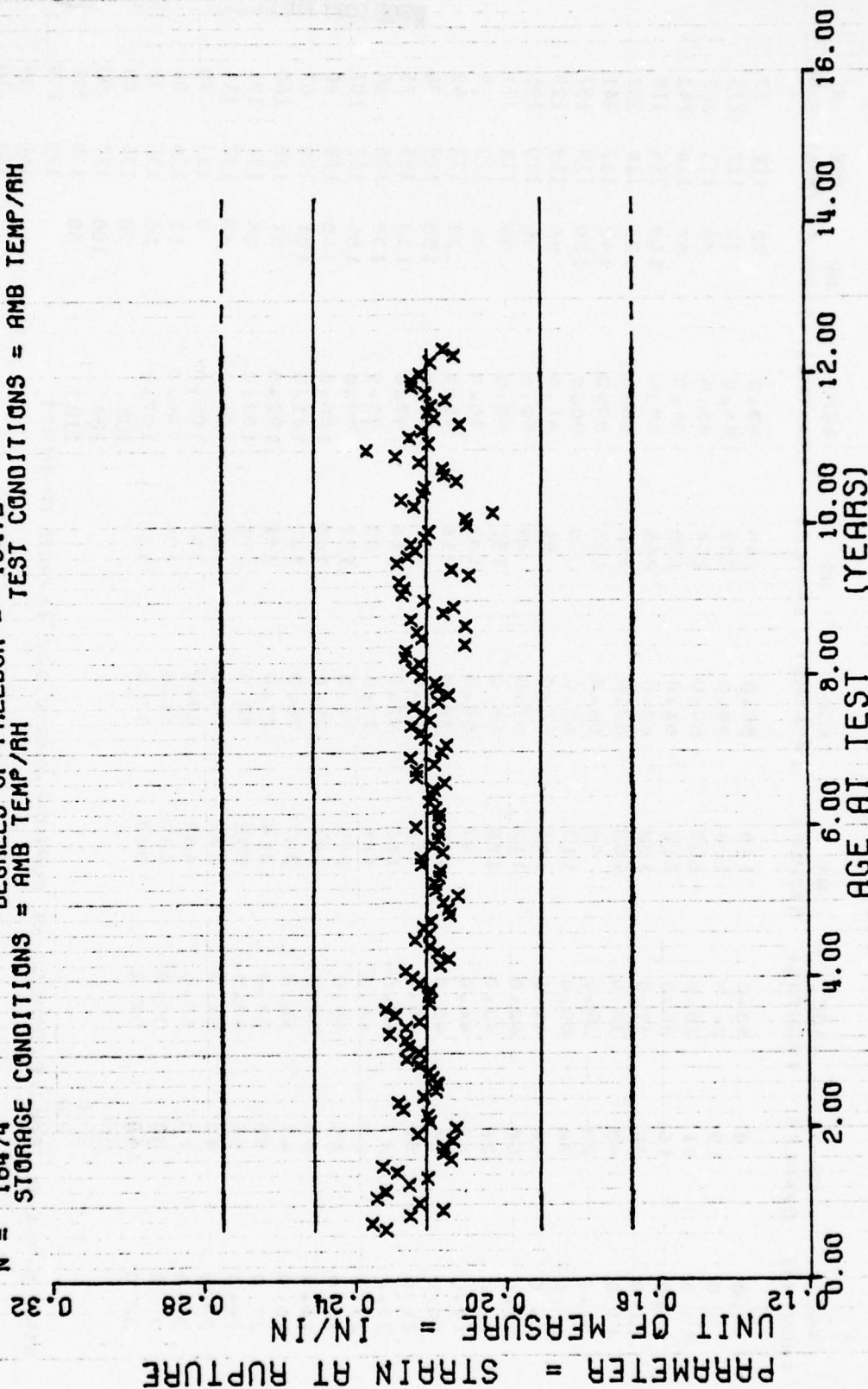
$Y = ((+7.6668477E+01) + (+4.3190707E-02) * X)$   
 $F = +7.3662602E+02$  SIGNIFICANCE OF F = SIGNIFICANT  $\sigma^2 = +7.0560326E+00$   
 $R = +2.0689520E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_e = +1.5913539E-03$   
 $t = +2.7140855E+01$  SIGNIFICANCE OF t = SIGNIFICANT  $S_e = +6.9035715E+00$   
 $N = 16474$  DEGREES OF FREEDOM = 16472  
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = AMB TEMP/AH



WING 6, V.L.R. TENSILE, MAXIMUM STRESS, CHS=0.002 IN/MIN TP-H1011

Figure 2

$F = +9.5234685E+00$   
 $R = -2.4038031E-02$   
 $t = +3.0860117E+00$   
 $N = 16474$   
 $Y = ((+2.2140540E-01) + (-1.2809898E-05) * X)$   
 SIGNIFICANCE OF F = SIGNIFICANT  
 SIGNIFICANCE OF R = SIGNIFICANT  
 SIGNIFICANCE OF t = SIGNIFICANT  
 DEGREES OF FREEDOM = 16472  
 STORAGE CONDITIONS = AMB TEMP/AH  
 TEST CONDITIONS = AMB TEMP/AH



WING 6, V.L.A. TENSILE STRAIN AT RUPTURE, CH3=0.002 IN/MIN TP-H1011

Figure 3

THIS PAGE IS BEST QUALITY PRACTICABLE  
FROM COPY FURNISHED TO DDC

AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES
9.0	3	33.0	140	58.0	249	83.0	72	111	27						
9.0	19	34.0	139	59.0	220	84.0	32	112	115						
10.0	11	35.0	107	60.0	294	85.0	36	113	282						
11.0	15	36.0	212	61.0	198	86.0	67	114	142						
12.0	30	37.0	132	62.0	265	87.0	113	115	118						
13.0	48	38.0	108	63.0	196	88.0	124	116	297						
14.0	28	39.0	96	64.0	126	89.0	142	117	241						
15.0	38	40.0	113	65.0	90	90.0	129	118	137						
16.0	46	41.0	146	66.0	61	91.0	86	119	129						
17.0	55	42.0	112	67.0	24	92.0	55	120	195						
18.0	28	43.0	120	68.0	131	93.0	99	121	117						
19.0	49	44.0	97	69.0	183	94.0	84	122	9						
20.0	24	45.0	135	70.0	216	95.0	122	123	42						
21.0	56	46.0	116	71.0	117	96.0	159	124	36						
22.0	27	47.0	163	72.0	116	97.0	123	125	75						
23.0	67	48.0	144	73.0	83	98.0	138	126	44						
24.0	55	49.0	175	74.0	137	99.0	165	127	101						
25.0	63	50.0	182	75.0	168	100.0	145	128	60						
26.0	47	51.0	347	76.0	129	101.0	121	129	63						
27.0	50	52.0	314	77.0	161	102.0	51	130	160						
28.0	56	53.0	292	78.0	88	103.0	55	131	191						
29.0	40	54.0	232	79.0	108	104.0	45	132	144						
30.0	73	55.0	468	80.0	104	105.0	9	133	79						
31.0	82	56.0	437	81.0	134	106.0	11	134	84						
32.0	149	57.0	367	82.0	132	107.0	16	135	36						
						108	90	136	48						
						109	108	137	90						
						110	48	138	237						
								139	139						
								140	39						
								141	10						
								142	15						
								143	176						
								144	83						
								146	3						
								147	6						
								148	6						

RUNNING 6.VOL.R.TFNSILE.STRESS AT RUPTURE.CHS=0.002 IN/MIN TP-H.011

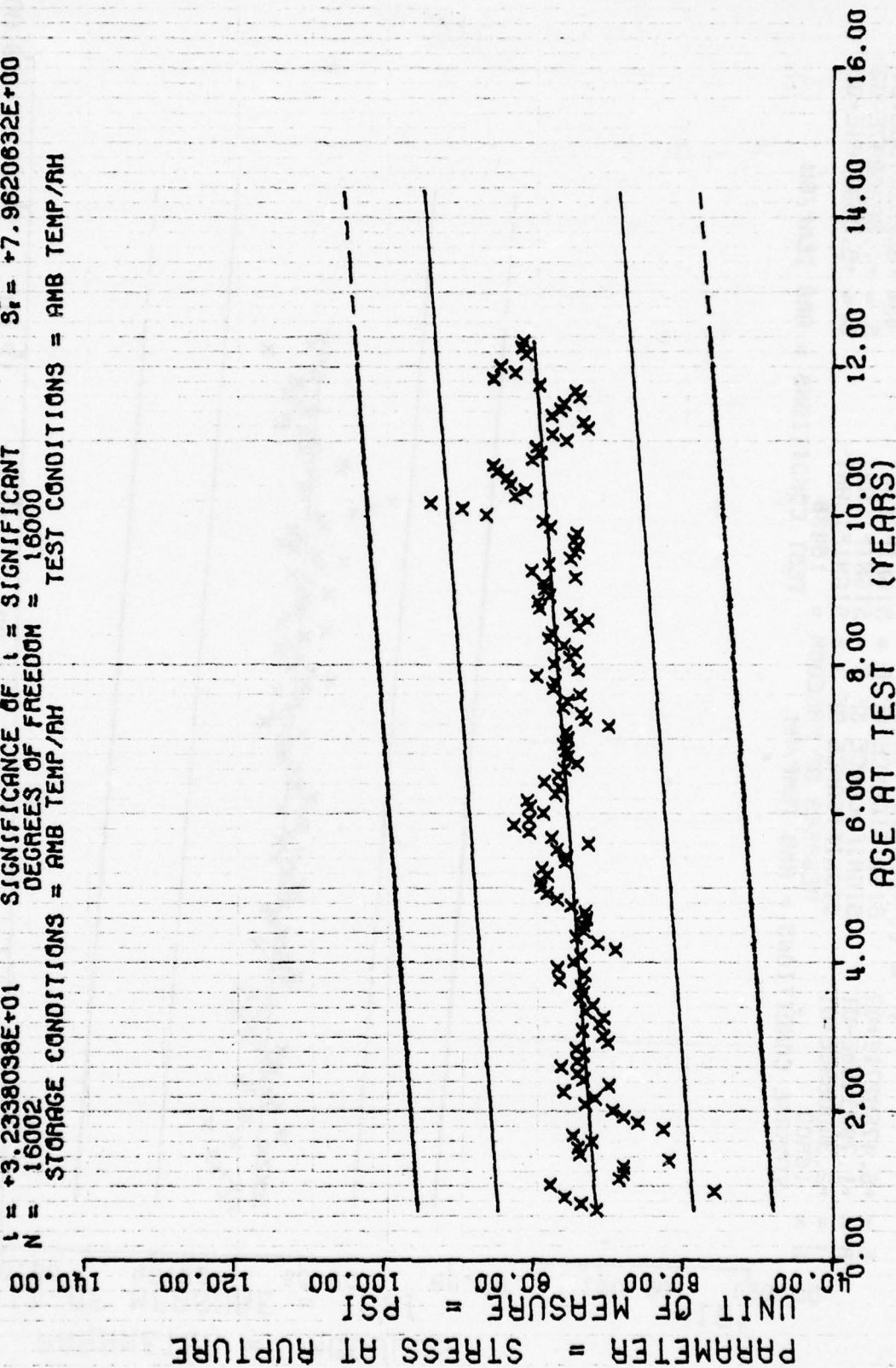
This sample size summary is applicable to figure 4.

6. V<sub>0</sub> L<sub>0</sub> R<sub>0</sub> TENSILE, STRESS AT RUPTURE, CHS=0.002 IN/MIN TP-H: 0.11

This sample size summary is applicable to figure 4

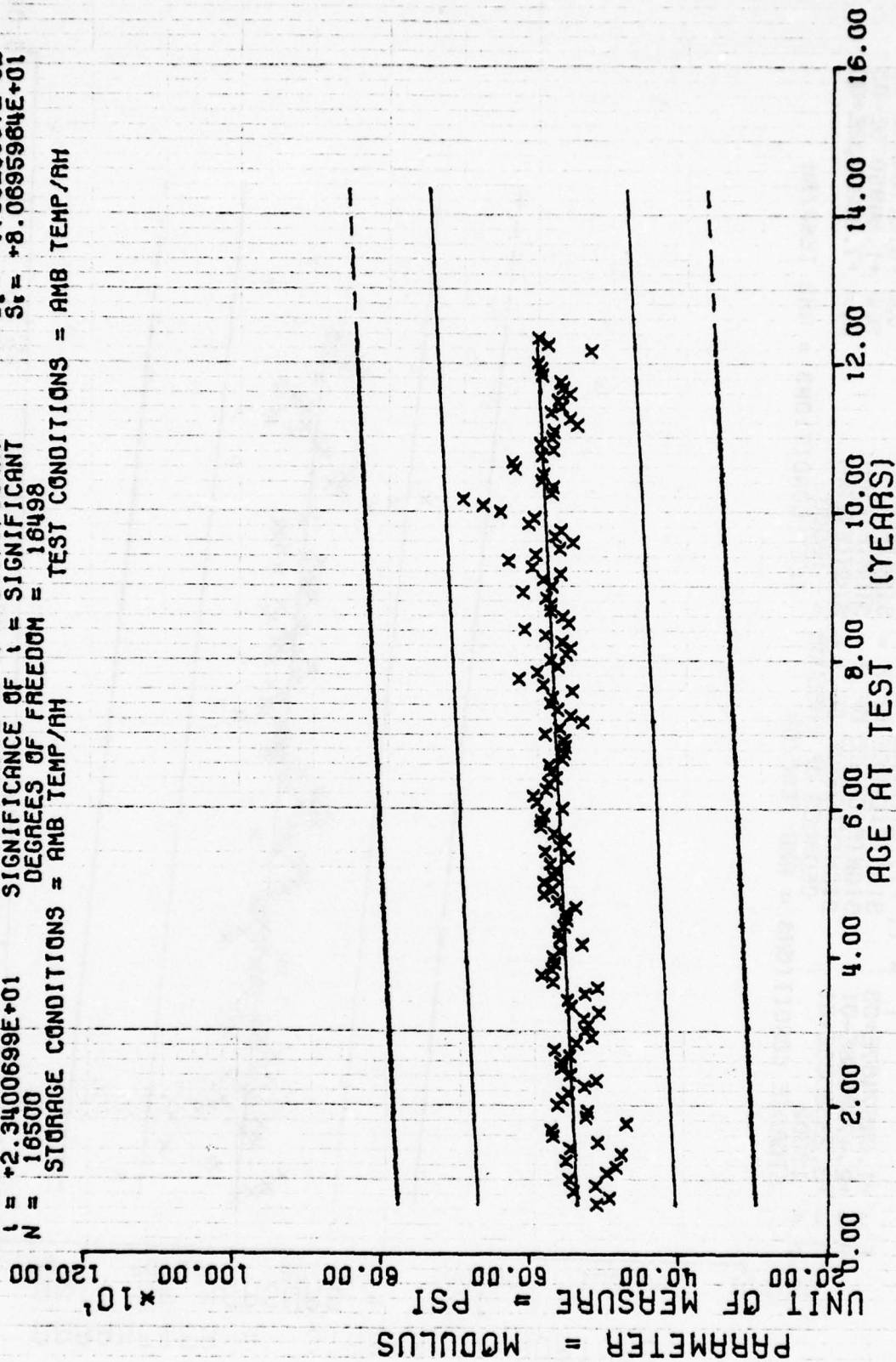


$Y = (( +7.1219225E+01 ) + ( +5.9809480E-02 ) * X)$   
 $F = +1.0457487E+03$  SIGNIFICANCE OF F = SIGNIFICANT  $\sigma^2 = +8.2178858E+00$   
 $R = +2.4768838E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_e = +1.8495079E-03$   
 $t = +3.2338038E+01$  SIGNIFICANCE OF t = SIGNIFICANT  $S_r = +7.9620632E+00$   
 $N = 16002$  DEGREES OF FREEDOM = 16000  
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = AMB TEMP/AH



WING 6, V.L.R. TENSILE STRESS AT RUPTURE, CHS=0.002 IN/MIN TP-H1011

$Y = ((+5.3413709E+02) + (+4.3595495E-01) * X)$   
 $F = +5.4759271E+02$  SIGNIFICANCE OF F = SIGNIFICANT  $\sigma = +8.2021755E+01$   
 $R = +1.7923498E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_e = +1.8629997E-02$   
 $t = +2.3400699E+01$  SIGNIFICANCE OF t = SIGNIFICANT  $S_t = +8.0695984E+01$   
 $N = 16500$  DEGREES OF FREEDOM = 16498  
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = AMB TEMP/AH



WING 6.V.L.R. TENSILE MODULUS, CHS=0.002 IN/MIN TP-H1011

Figure 5

\*\*\* SAMPLE SIZE SUMMARY \*\*\*

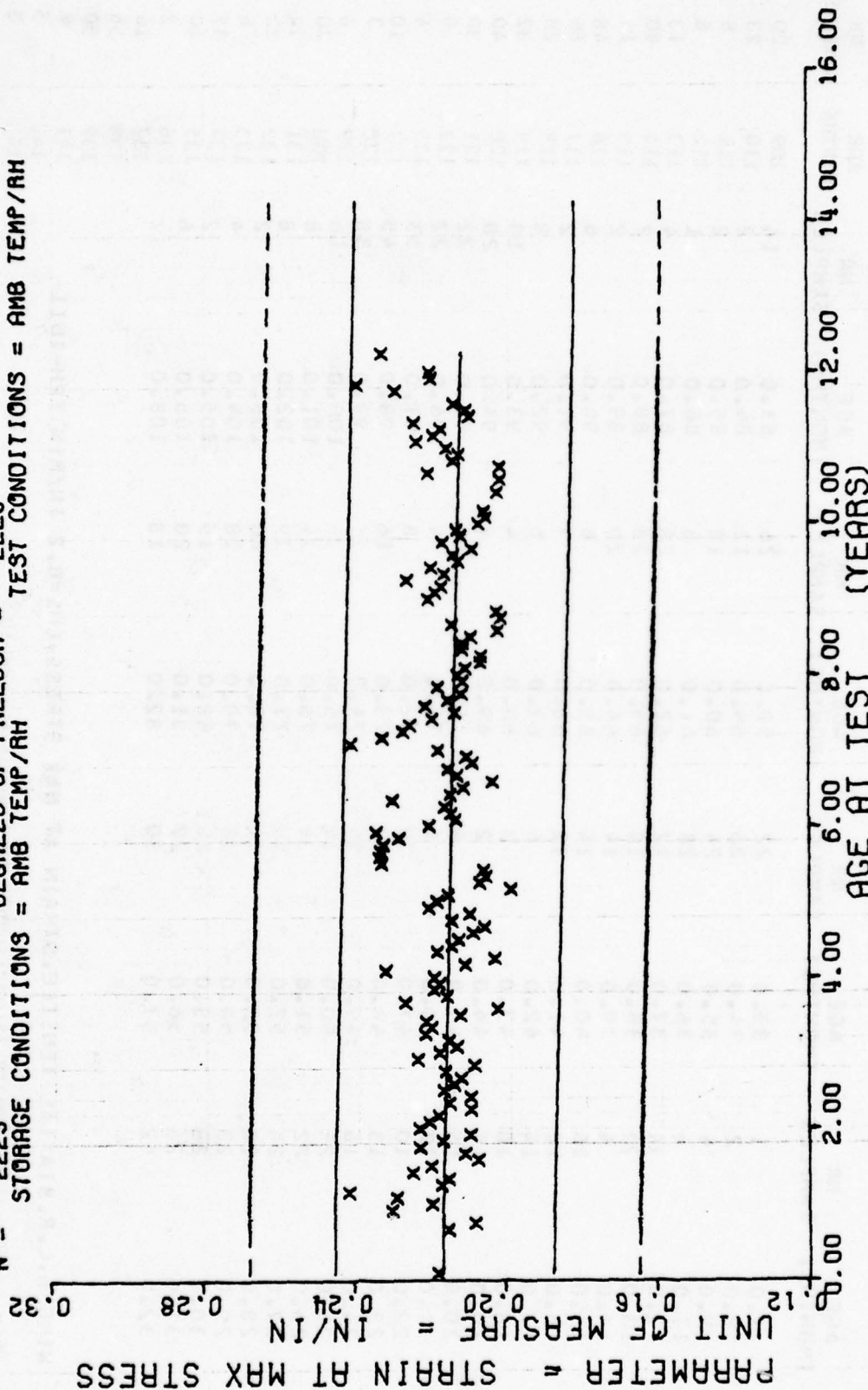
AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES
1.0	1	33.0	22	58.0	26	83.0	14	109	20
8.0	2	34.0	26	59.0	12	84.0	2	110	23
9.0	4	35.0	24	60.0	18	85.0	2	111	8
11.0	6	36.0	28	61.0	8	86.0	1	112	8
12.0	14	37.0	12	62.0	28	87.0	4	113	13
13.0	22	38.0	10	63.0	28	88.0	2	114	60
14.0	4	39.0	14	64.0	20	89.0	2	115	14
15.0	16	40.0	14	65.0	6	90.0	6	116	48
16.0	12	41.0	12	66.0	7	91.0	2	117	66
17.0	14	42.0	6	67.0	6	92.0	8	118	28
18.0	16	43.0	2	68.0	4	93.0	10	119	32
19.0	14	44.0	2	69.0	4	94.0	20	120	40
20.0	16	45.0	4	70.0	8	95.0	22	121	30
21.0	12	46.0	6	71.0	4	96.0	22	122	6
22.0	10	47.0	10	72.0	8	97.0	33	125	4
23.0	13	48.0	12	73.0	16	98.0	45	127	10
24.0	16	49.0	16	74.0	18	99.0	38	128	3
25.0	25	50.0	14	75.0	29	100.0	16	129	6
26.0	22	51.0	34	76.0	14	101.0	8	130	20
27.0	24	52.0	49	77.0	19	102.0	8	131	74
28.0	28	53.0	41	78.0	20	103.0	2	132	22
29.0	23	54.0	18	79.0	18	104.0	4	133	6
30.0	26	55.0	28	80.0	15	105.0	2	134	17
31.0	26	56.0	22	81.0	20	106.0	6	135	10
32.0	42	57.0	30	82.0	18	108.0	12	136	2
								137	16
								138	56
								139	30
								141	4
								142	5
								143	2
								144	2
								147	2

WING 6.L.R.BIAXIAL TENSILE,STRAIN AT MAX STRESS,CHS=0.2 IN/MIN TPH-1011

This sample size summary is applicable to Figures 6 thru 10.



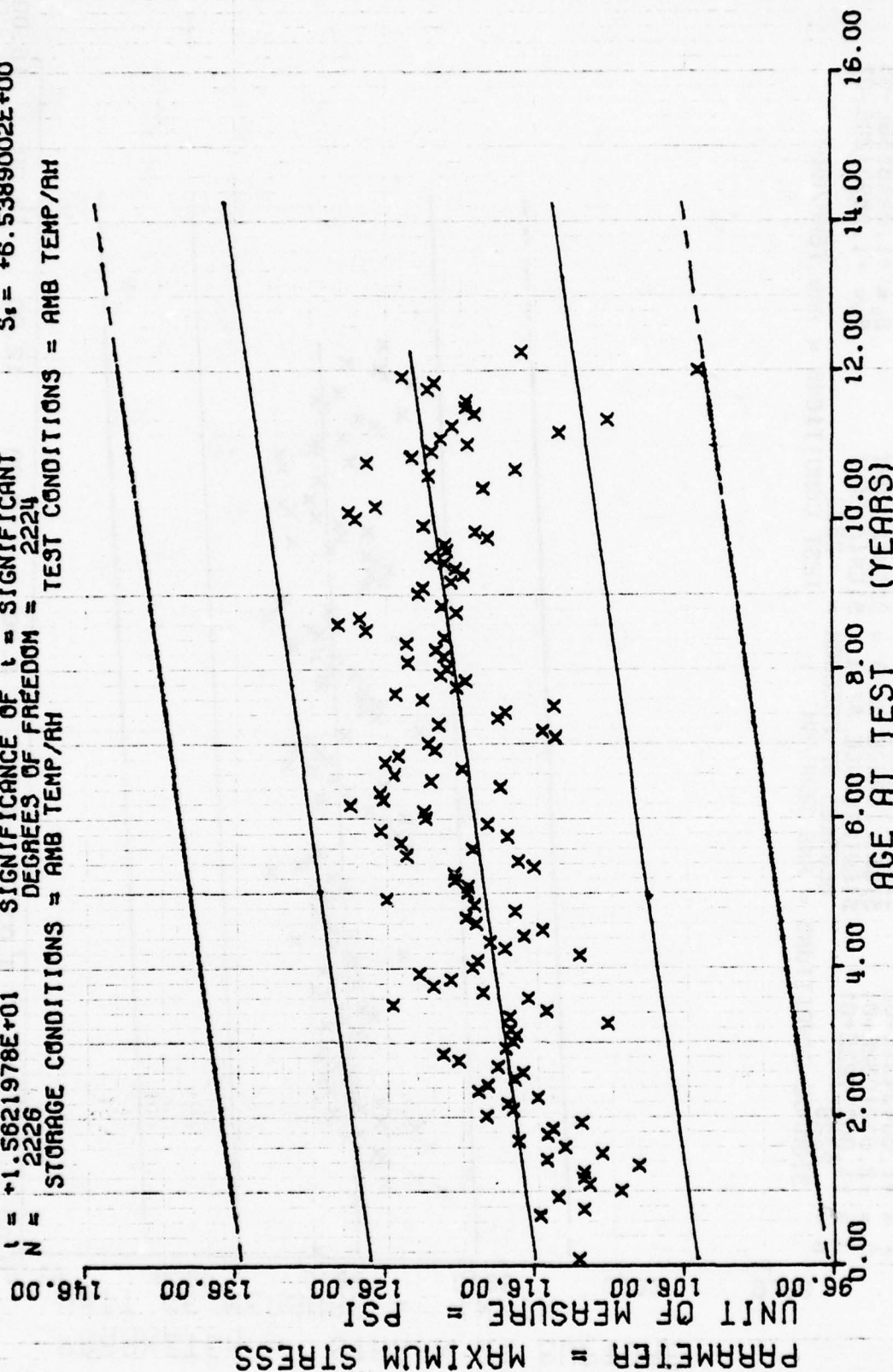
$Y = ((+2.1659826E-01) + (-4.0498579E-05) \times X)$   
 $F = +1.8809188E+01$  SIGNIFICANCE OF F = SIGNIFICANT  $\sigma = +1.7216854E-02$   
 $R = -9.1597940E-02$  SIGNIFICANCE OF R = SIGNIFICANT  $S_e = +9.3380191E-06$   
 $t = +4.3369561E+00$  SIGNIFICANCE OF t = SIGNIFICANT  $S_e = +1.7148331E-02$   
 $N = 2225$  DEGREES OF FREEDOM = 2223  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6, L.A. BIAXIAL TENSILE STRAIN AT MAX STRESS, CHS=0.2 IN/MIN TPH-1011

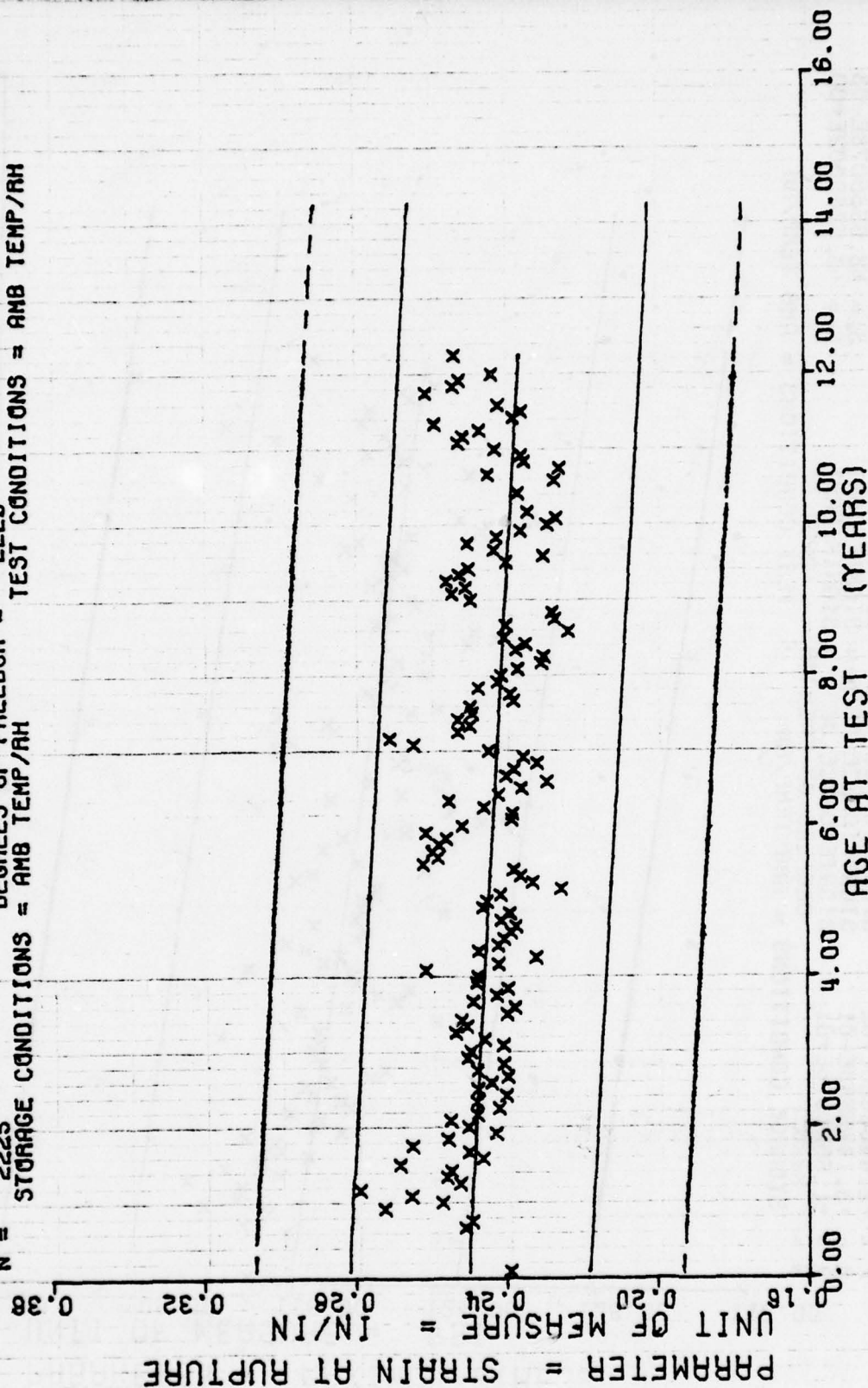


$Y = ((+1.1595217E+02) + (+5.5595618E-02) * X)$   
 $F = +2.4404620E+02$  SIGNIFICANCE OF F = SIGNIFICANT  $S_e = +6.8867822E+00$   
 $R = +3.1445563E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_e = +3.5588078E-03$   
 $t = +1.5621978E+01$  SIGNIFICANCE OF t = SIGNIFICANT  $S_e = +6.5389002E+00$   
 $N = 2226$  DEGREES OF FREEDOM = 2224  
 STORAGE CONDITIONS = AMB TEMP/AM TEST CONDITIONS = AMB TEMP/AM



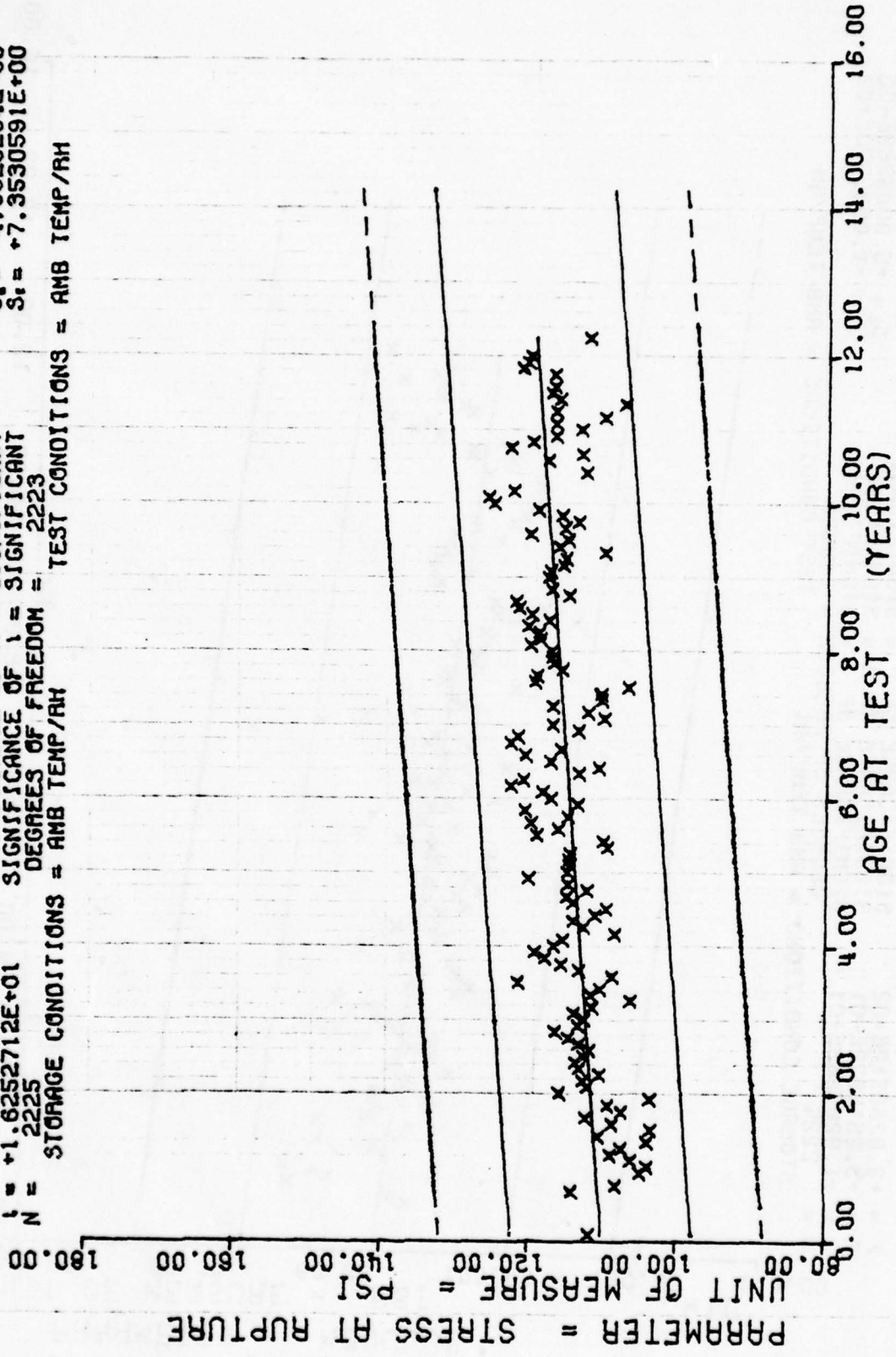
WING 6, L.A. BIAXIAL TENSILE, MAXIMUM STRESS, CHS=0.2 IN/MIN TPRH-1011

$Y = ((+2.5018113E-01) + (-1.0305903E-04) * X)$   
 $F = +1.0043491E+02$  SIGNIFICANCE OF F = SIGNIFICANT  $S_0 = +1.9307795E-02$   
 $R = -2.0791082E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_1 = +1.0283565E-05$   
 $t = +1.0021722E+01$  SIGNIFICANCE OF t = SIGNIFICANT  $S_2 = +1.8890124E-02$   
 $N = 2225$  DEGREES OF FREEDOM = 2223  
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = AMB TEMP/AH



WING 6, L.R. BIAXIAL TENSILE, STRAIN AT RUPTURE, CHS=0.2 IN/MIN TPH-1011

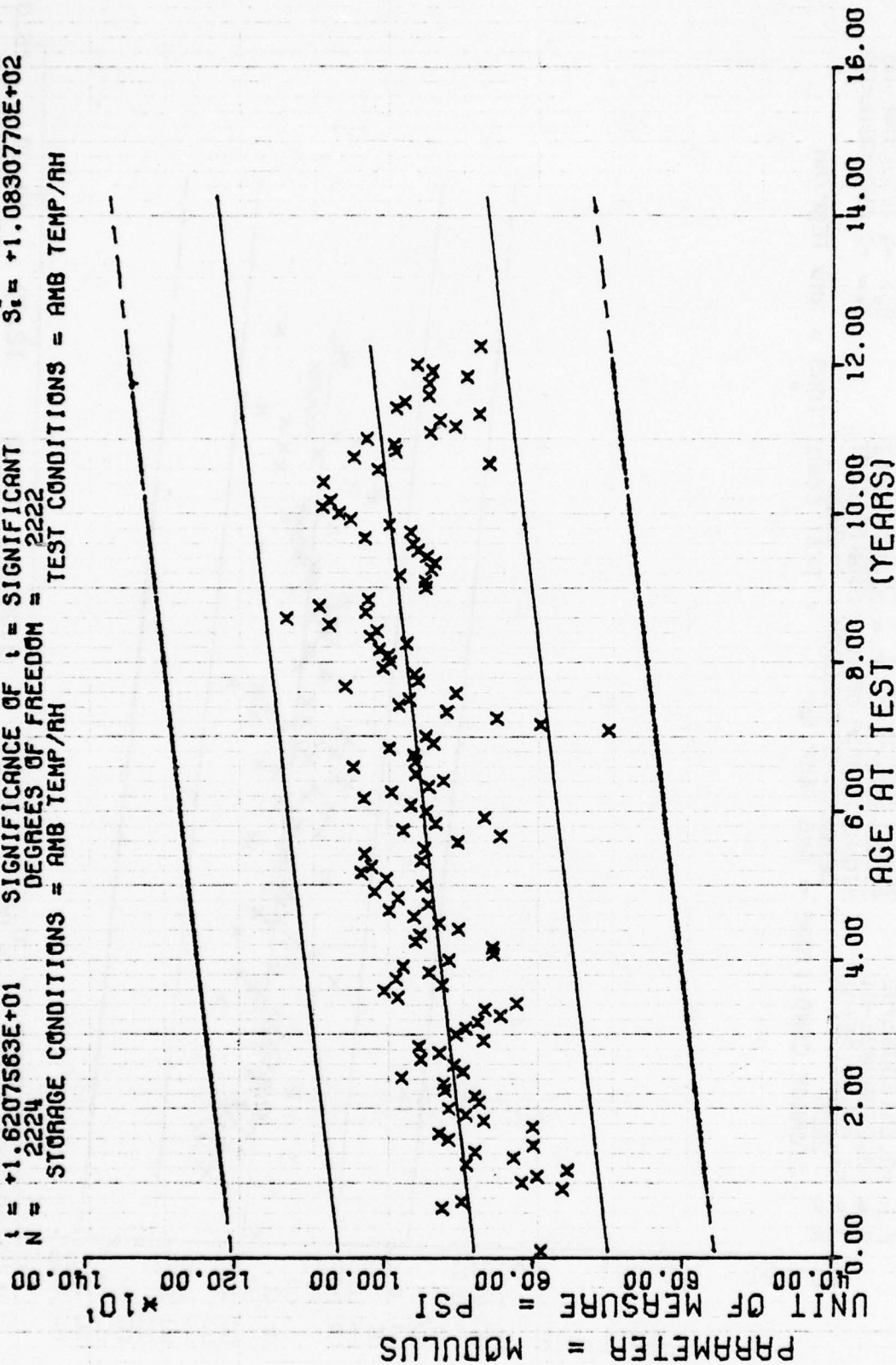
$F = +2.6415066E+02$   
 $R = +3.2589283E-01$   
 $t = +1.6252712E+01$   
 $N = 2225$   
 $Y = ((+1.1008123E+02) + (+6.5058314E-02) * X)$   
 SIGNIFICANCE OF F = SIGNIFICANT  
 SIGNIFICANCE OF R = SIGNIFICANT  
 SIGNIFICANCE OF t = SIGNIFICANT  
 DEGREES OF FREEDOM = 2223  
 STORAGE CONDITIONS = AMB TEMP/RH  
 TEST CONDITIONS = AMB TEMP/RH



WING 6.L.R.BIAXIAL TENSILE, STRESS AT RUPTURE, CHS=0.2 IN/MIN TFM-1011



$Y = ((+8.7991549E+02) + (+9.5633167E-01) * X)$   
 $F = +2.6268512E+02$  SIGNIFICANCE OF F = SIGNIFICANT  $G = +1.1450522E+02$   
 $R = +3.2514872E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_1 = +5.9005269E-02$   
 $t = +1.6207563E+01$  SIGNIFICANCE OF t = SIGNIFICANT  $S_2 = +1.0830770E+02$   
 $N = 2224$  DEGREES OF FREEDOM = 2222  
 STORAGE CONDITIONS = AMB TEMP/ RH TEST CONDITIONS = AMB TEMP/ RH



WING 6.L.R.BIAXIAL TENSILE.MODULUS.CHS=0.2 IN/MIN TPH-1011

Figure 10



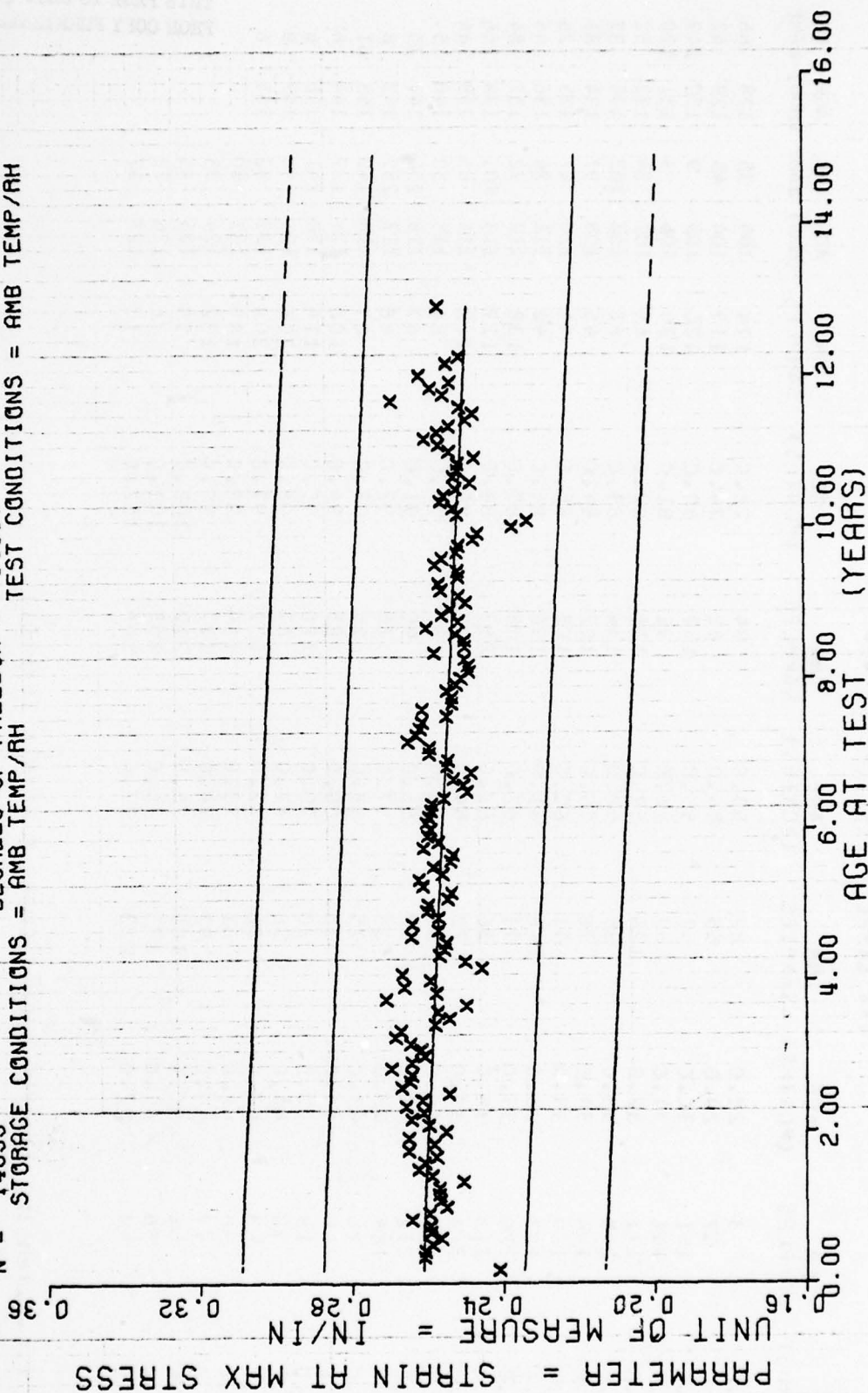
\*\*\* SAMPLE SIZE SUMMARY \*\*\*

[illegible]

WIGS 6, L.R. TENSILE, MAXIMUM STRESS, CHS=2.0 IN/MIN TP-T1011

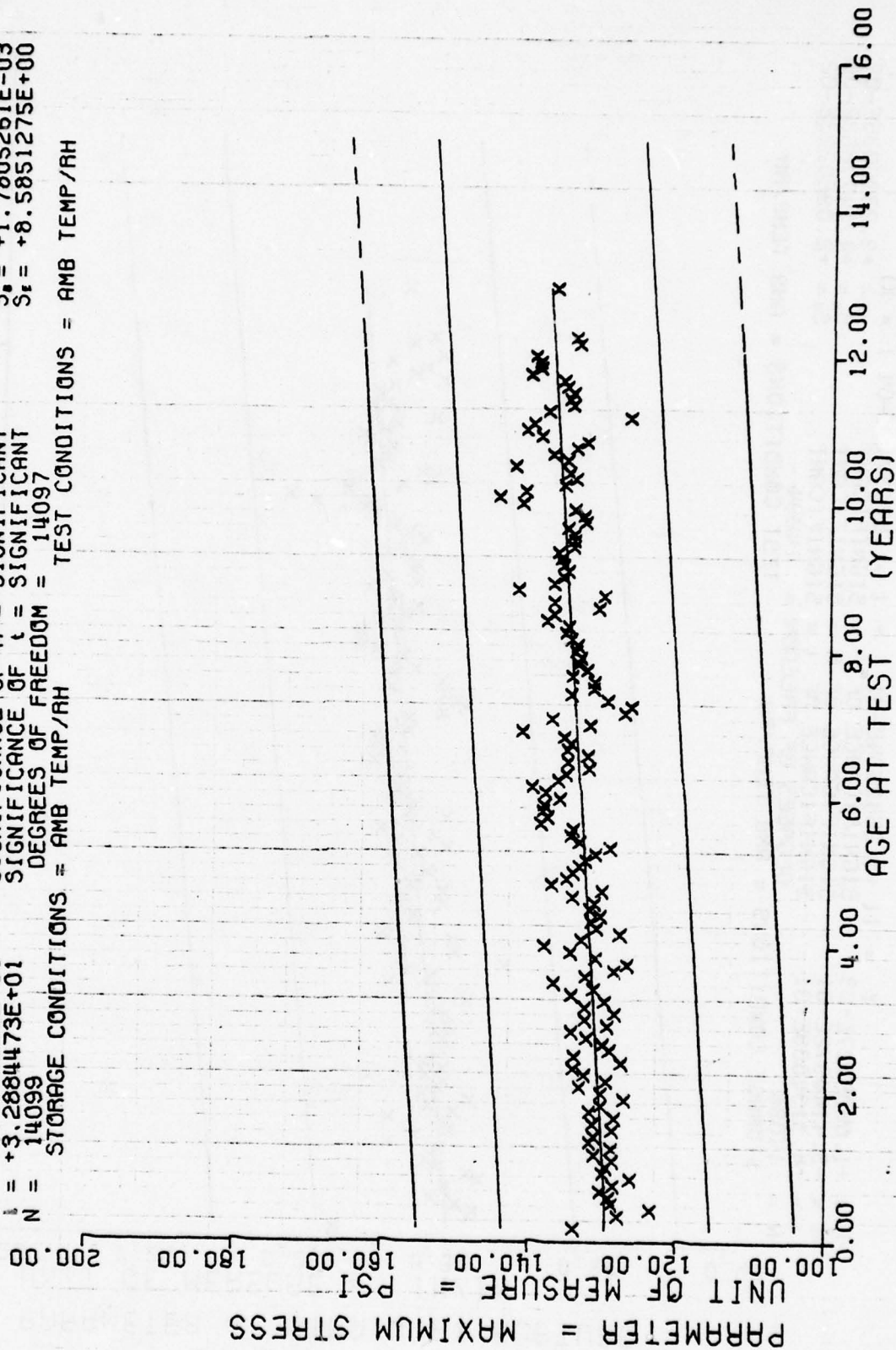
This sample size summary is applicable to figures 11 thru 15

$Y = ((+2.6164230E-01) + (-8.5952002E-05) * X)$   
 $F = +6.7209758E+02$  SIGNIFICANCE OF F = SIGNIFICANT  $S_1 = +1.6362002E-02$   
 $R = -2.1332373E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_2 = +3.3154297E-06$   
 $t = +2.5924844E+01$  SIGNIFICANCE OF t = SIGNIFICANT  $S_3 = +1.5985941E-02$   
 $N = 14099$  DEGREES OF FREEDOM = 14097  
 STORAGE CONDITIONS = AMB TEMP/ RH TEST CONDITIONS = AMB TEMP/ RH



WING 6.L.A. TENSILE, STRAIN AT MAX STRESS, CHS=2.0 IN/MIN TP-H1011

$F = +1.0813886E+03$   
 $R = +2.6691812E-01$   
 $N = +3.2884473E+01$   
 $N = 14099$   
 $Y = (( +1.2938927E+02 ) + ( +5.8551665E-02 ) * X)$   
 SIGNIFICANCE OF F = SIGNIFICANT  
 SIGNIFICANCE OF R = SIGNIFICANT  
 SIGNIFICANCE OF t = SIGNIFICANT  
 DEGREES OF FREEDOM = 14097  
 STORAGE CONDITIONS = AMB TEMP/RH  
 TEST CONDITIONS = AMB TEMP/RH

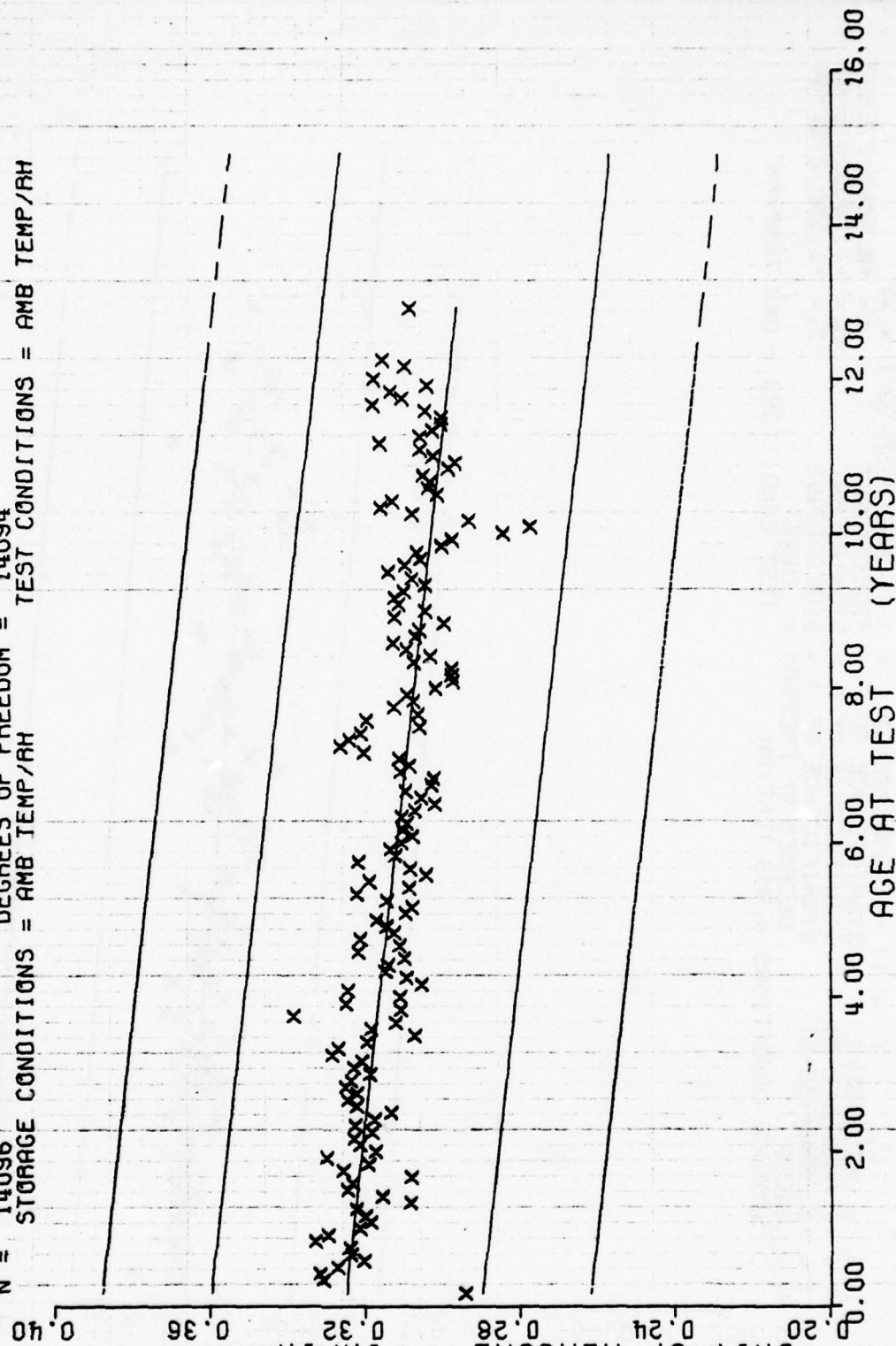


WING 6 L.R. TENSILE, MAXIMUM STRESS, CHS=2.0 IN/MIN TP-H1011



$Y = ((+3.2542534E-01) + (-1.8753745E-04) * X)$   
 $F = +1.8605427E+03$  SIGNIFICANCE OF F = SIGNIFICANT  
 $R = -3.4148972E-01$  SIGNIFICANCE OF R = SIGNIFICANT  
 $t = +4.3134008E+01$  SIGNIFICANCE OF t = SIGNIFICANT  
 $N = 14096$  DEGREES OF FREEDOM = 14094  
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = AMB TEMP/AH

PARAMETER = STRAIN AT RUPTURE  
 UNIT OF MEASURE = IN/IN



WING 6.L.R. TENSILE, STRAIN AT RUPTURE, CHS=2.0 IN/MIN TP-H1011



$F = +7.6748260E+02$   
 $R = +2.2725728E-01$   
 $t = +2.7703476E+01$   
 $N = 14095$

$Y = (( +1.1944078E+02 ) + ( +4.7009721E-02 ) * X)$   
 SIGNIFICANCE OF F = SIGNIFICANT  
 SIGNIFICANCE OF R = SIGNIFICANT  
 SIGNIFICANCE OF t = SIGNIFICANT  
 DEGREES OF FREEDOM = 14093

STORAGE CONDITIONS = AMB TEMP/RH  
 TEST CONDITIONS = AMB TEMP/RH

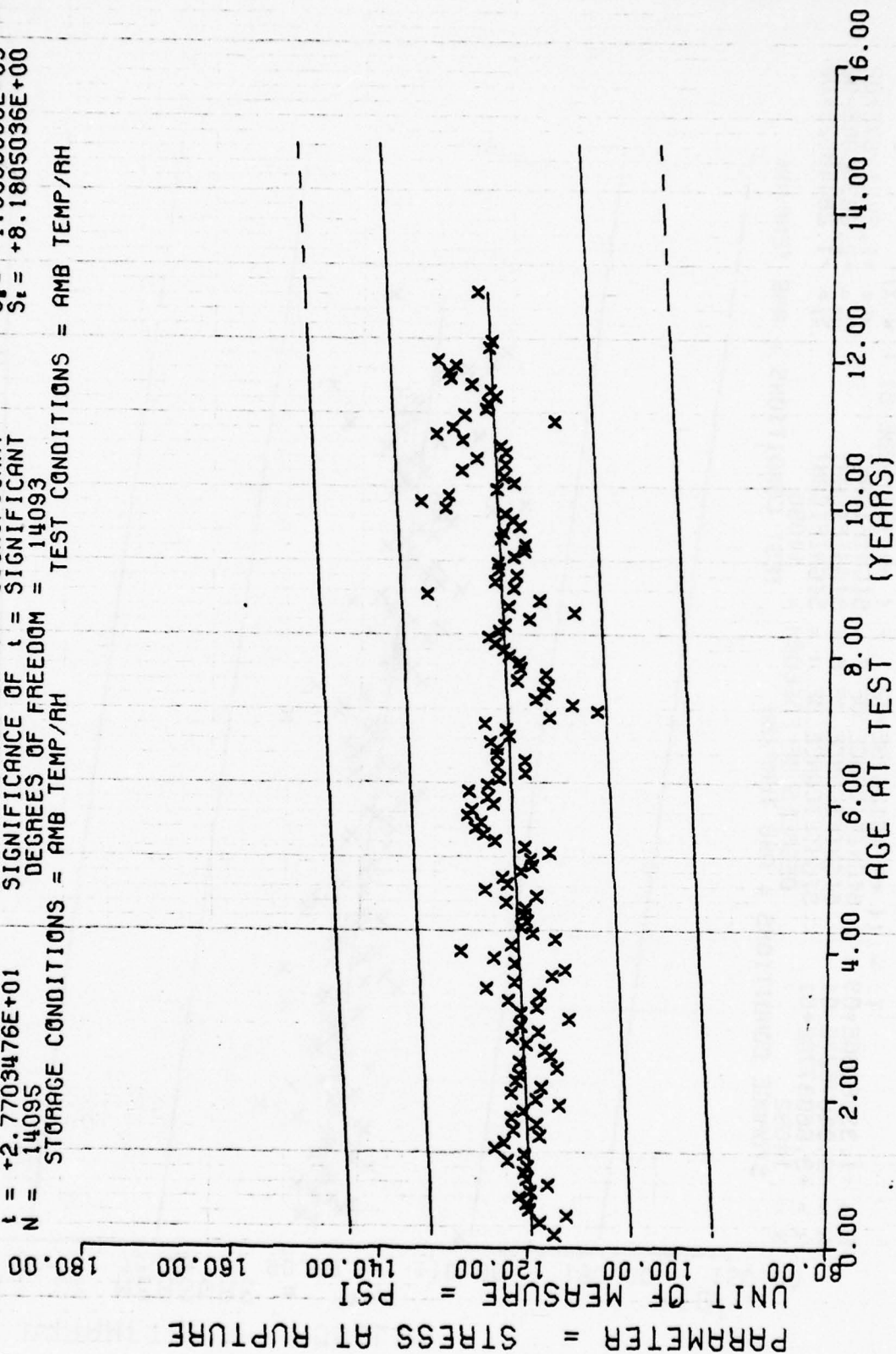
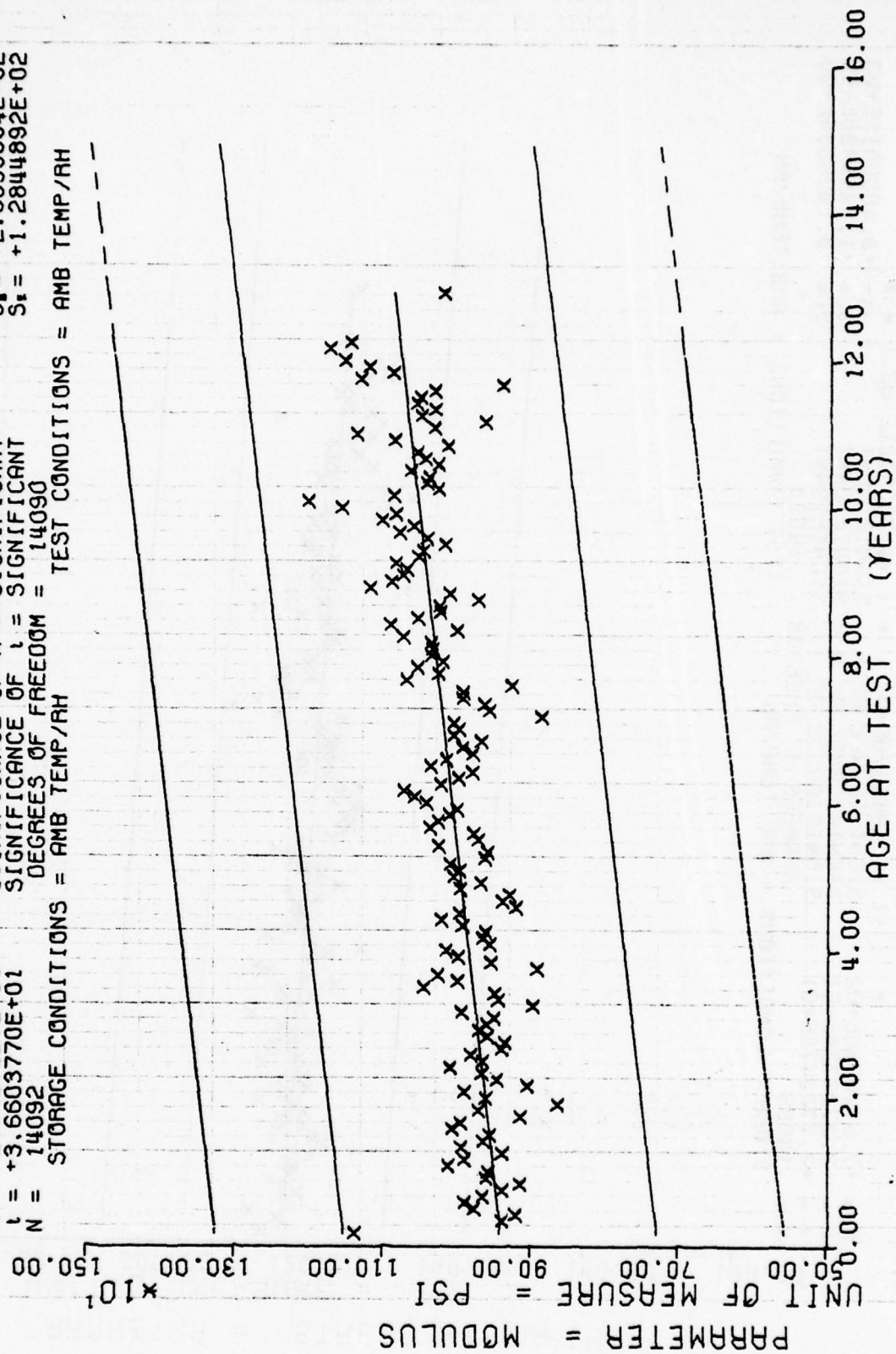


Figure 14

$F = +1.3398360E+03$   
 $R = +2.9467627E-01$   
 $l = +3.6603770E+01$   
 $N = 14092$

$Y = ((+9.4012679E+02) + (+9.7511328E-01) * X)$   
 SIGNIFICANCE OF F = SIGNIFICANT  
 SIGNIFICANCE OF R = SIGNIFICANT  
 SIGNIFICANCE OF l = SIGNIFICANT  
 DEGREES OF FREEDOM = 14090

STORAGE CONDITIONS = AMB TEMP/AH  
 TEST CONDITIONS = AMB TEMP/AH



WING 6.L.A. TENSILE MODULUS, CHS=2.0 IN/MIN TP-H1011

Figure 15

\*\*\* SAMPLE SIZE SUMMARY \*\*\*

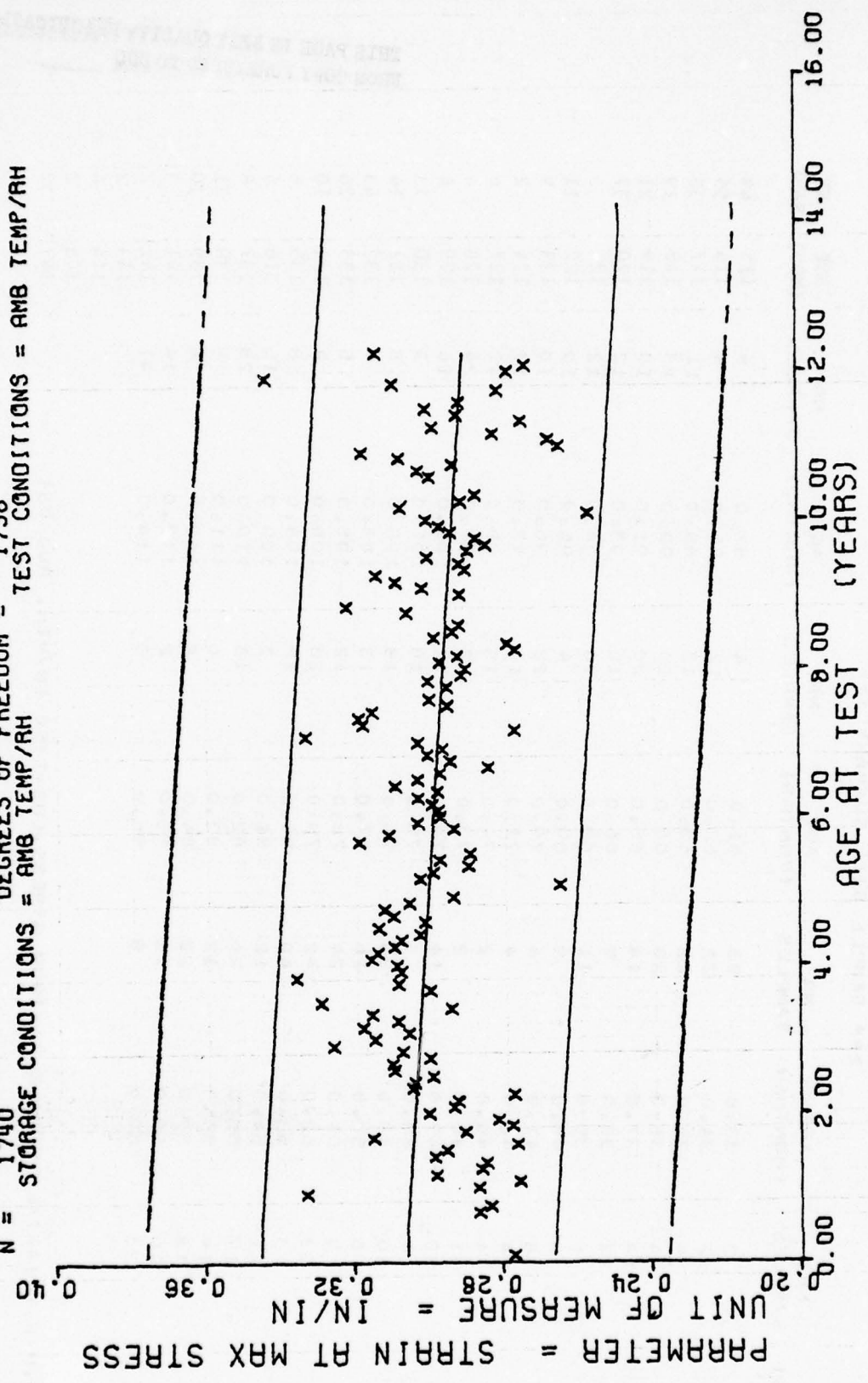
[illegible]

WING 6. H. R. TRIAXIAL TENSILE, MAXIMUM STRESS, CHS=1750 IN/MIN. 800 PSI

This sample size summary is applicable to figures 16 thru 20



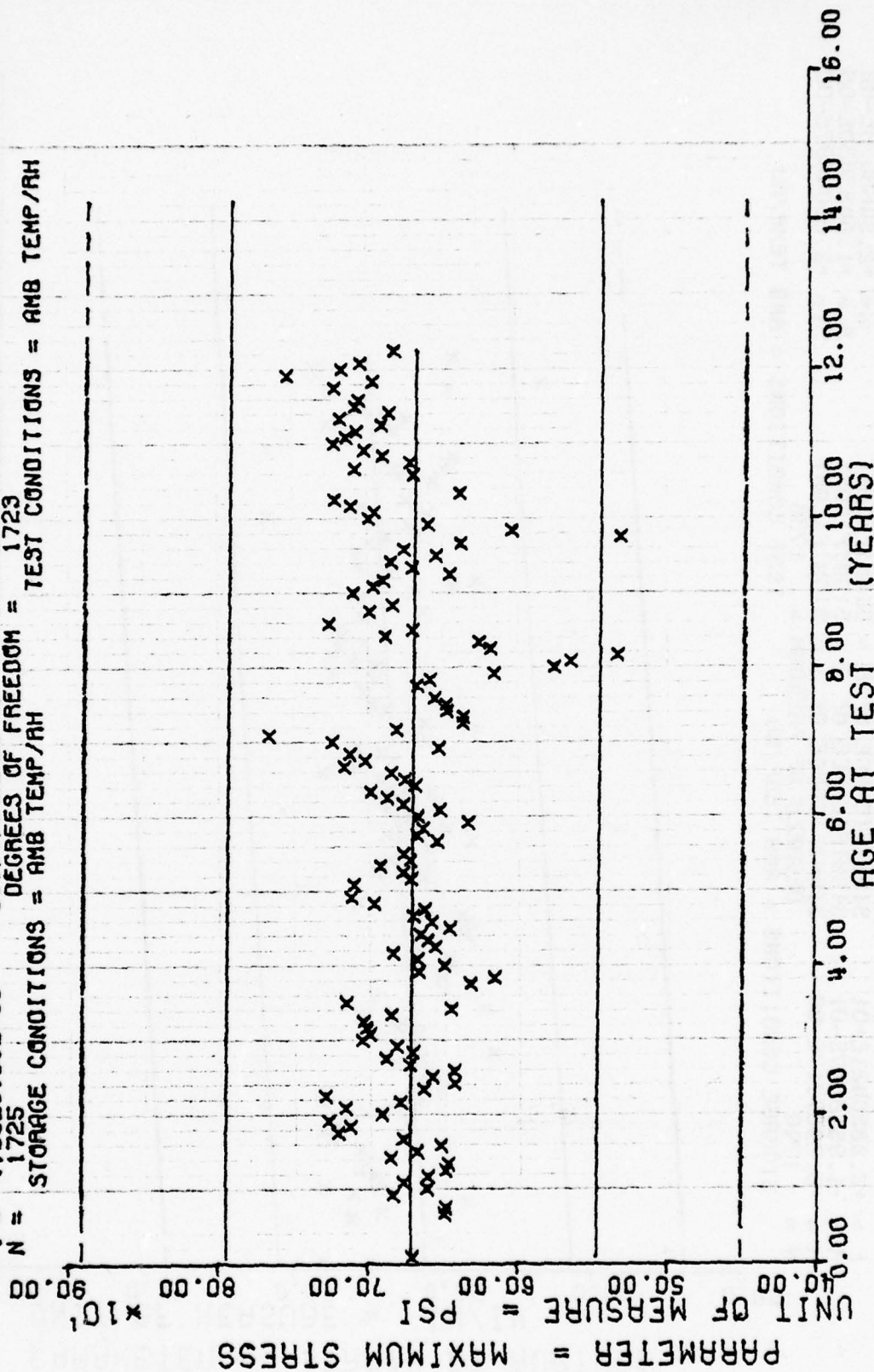
$Y = ((+3.0607156E-01) + (-1.1658622E-04) * X)$   
 $F = +6.1265217E+01$  SIGNIFICANCE OF F = SIGNIFICANT  
 $R = -1.8452677E-01$  SIGNIFICANCE OF R = SIGNIFICANT  
 $t = +7.8272100E+00$  SIGNIFICANCE OF t = SIGNIFICANT  
 $N = 1740$  DEGREES OF FREEDOM = 1738  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6, H. A. TRIAXIAL TENSILE STRAIN AT MAX STRESS, CHS=1750 IN/MIN, 800 PSI

Figure 16

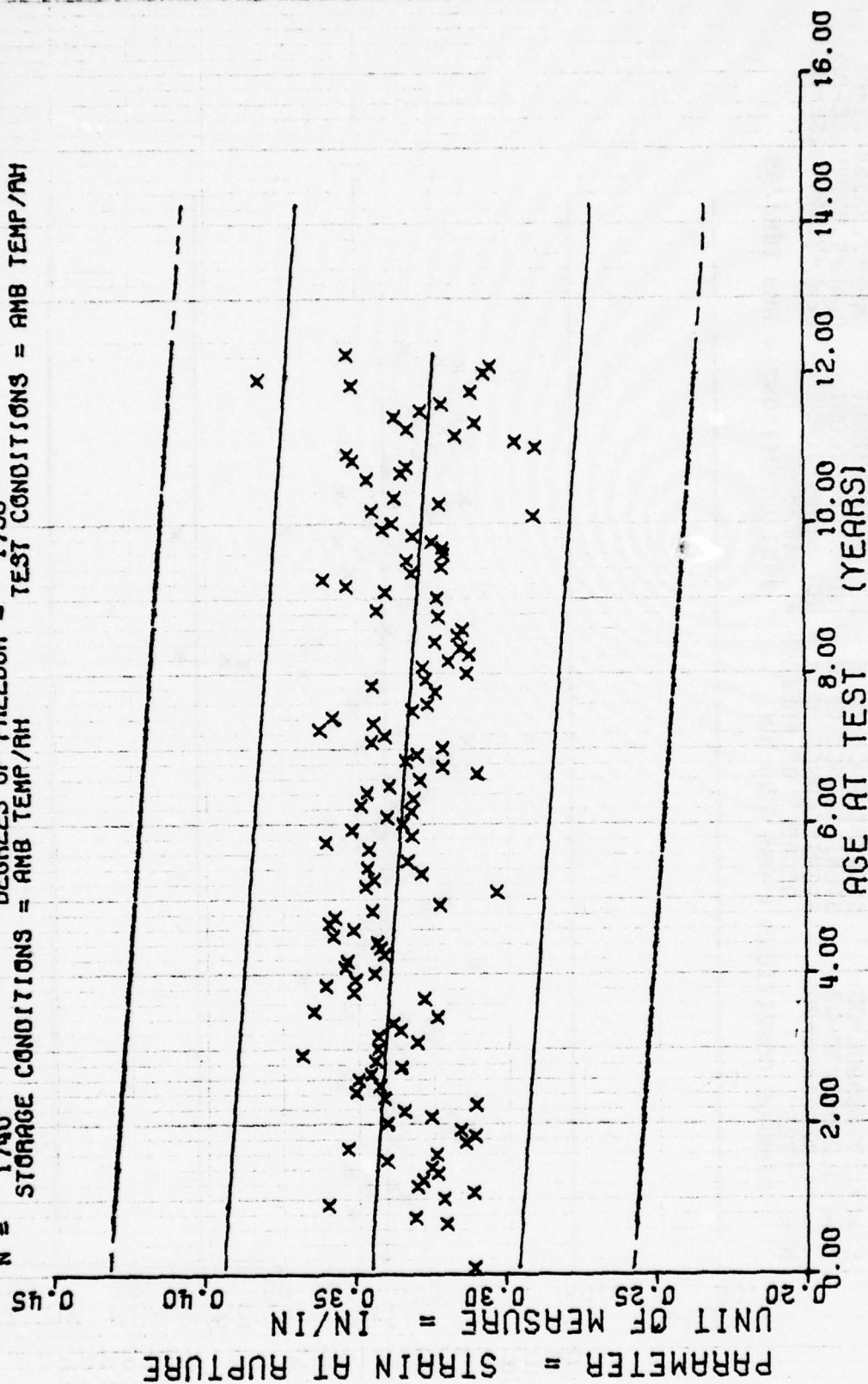
$Y = ((+6.7155045E+02) + (-6.2355015E-02) * X)$   
 $F = +1.7755990E+00$  SIGNIFICANCE OF F = NOT SIGNIFICANT  $S_e = +7.3315402E+01$   
 $R = -3.2085303E-02$  SIGNIFICANCE OF R = NOT SIGNIFICANT  $S_b = +4.6794944E-02$   
 $I = +1.3325160E+00$  SIGNIFICANCE OF I = NOT SIGNIFICANT  $S_i = +7.3298915E+01$   
 $N = 1725$  DEGREES OF FREEDOM = 1723  
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = AMB TEMP/AH



WING 6,H.R.TRIAXIAL TENSILE,MAXIMUM STRESS,CHS=1750 IN/MIN, 800 PSI

Figure 17

$Y = ((+3.4493304E-01) + (-1.5293796E-04) * X)$   
 $F = +6.8836421E+01$  SIGNIFICANCE OF F = SIGNIFICANT  $G = +2.9463073E-02$   
 $R = -1.9518647E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S = +1.8433430E-05$   
 $t = +8.2967717E+00$  SIGNIFICANCE OF t = SIGNIFICANT  $S_1 = +2.8904697E-02$   
 $N = 1740$  DEGREES OF FREEDOM = 1738  
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = AMB TEMP/AH



WING 6.H.A. TRIAXIAL TENSILE, STRAIN AT RUPTURE, CHS=1750 IN/MIN, 800 PSI

Figure 18



PARAMETER = STRESS AT RUPTURE

UNIT OF MEASURE = PSI

AGE AT TEST (YEARS)

STORAGE CONDITIONS = AMB TEMP/RH

TEST CONDITIONS = AMB TEMP/RH

DEGREES OF FREEDOM = 1738

SIGNIFICANCE OF  $t$  = NOT SIGNIFICANT

$t$  = +1.5318281E+00

$N$  = 1740

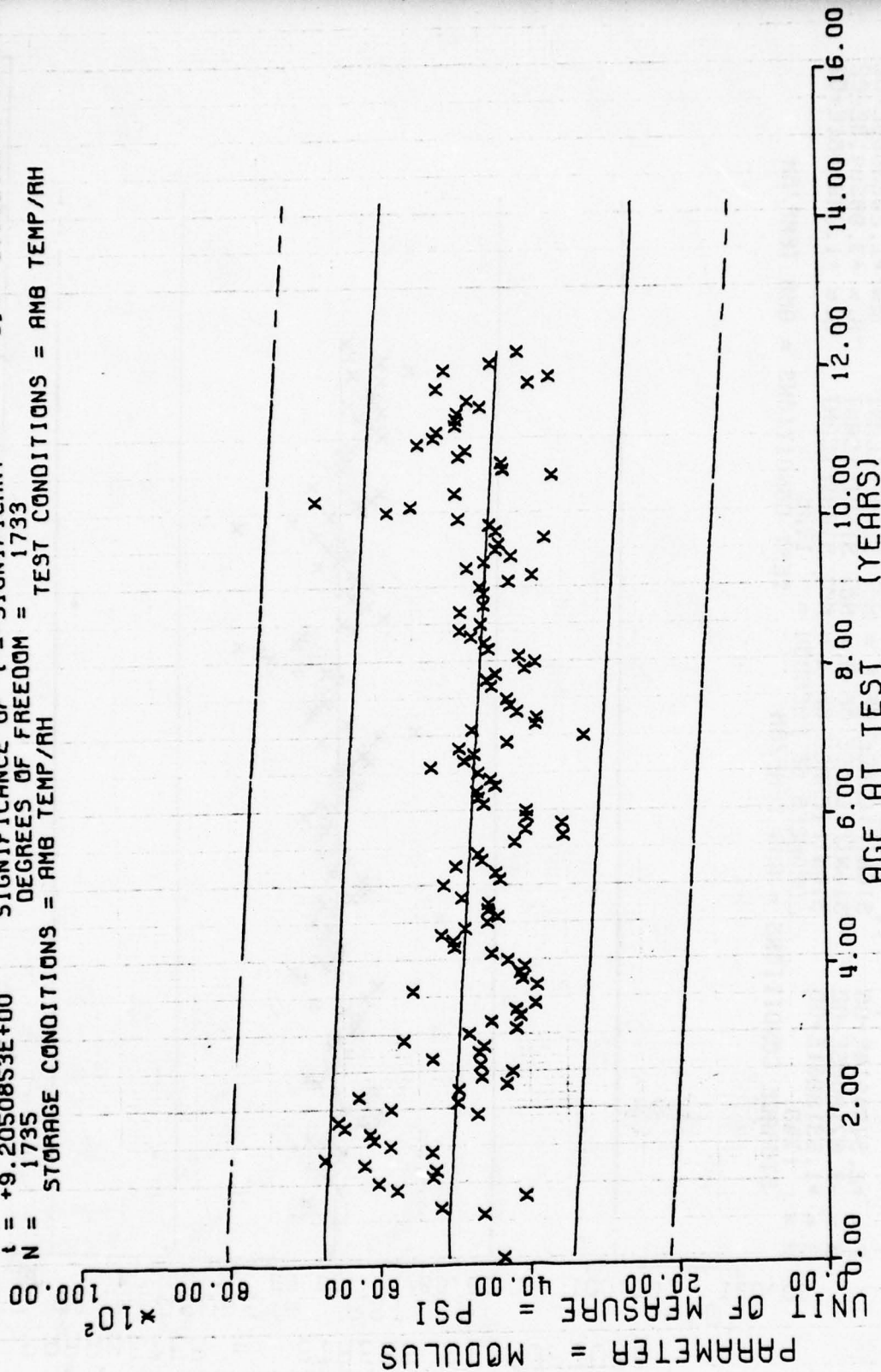
SIZE = 1.2431001E+02

Age at Test (Years)	Stress at Rupture (PSI)
2.00	55.00
2.50	58.00
3.00	60.00
3.50	62.00
4.00	65.00
4.50	68.00
5.00	70.00
5.50	72.00
6.00	75.00
6.50	78.00
7.00	80.00
7.50	82.00
8.00	85.00
8.50	88.00
9.00	90.00
9.50	92.00
10.00	95.00
10.50	98.00
11.00	100.00
11.50	102.00
12.00	105.00
12.50	108.00
13.00	110.00
13.50	112.00
14.00	115.00
14.50	118.00
15.00	120.00

WING 6, H. A. TRIAXIAL TENSILE, STRESS AT RUPTURE, CHS=1750 IN/MIN, 800 PSI

Figure 19

$Y = ((+5.1243258E+03) + (-5.8019942E+00) * X)$   
 $F = +8.4733595E+01$  SIGNIFICANCE OF F = SIGNIFICANT  
 $R = -2.1590500E-01$  SIGNIFICANCE OF R = SIGNIFICANT  
 $t = +9.2050853E+00$  SIGNIFICANCE OF t = SIGNIFICANT  
 $N = 1735$  DEGREES OF FREEDOM = 1733  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6, H.R. TRIAXIAL TENSILE, MODULUS, CHS=1750 IN/MIN AT 800 PSI

\*\*\* SAMPLE SIZE SUMMARY \*\*\*

AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES
9.C	2	35.C	5	60.0	8	88.0	15	113	79
11.C	12	36.C	20	61.0	17	89.C	42	114	51
12.C	12	37.C	24	62.0	40	90.C	46	115	23
13.C	18	38.C	22	63.0	84	91.0	21	116	32
14.C	4	39.C	20	64.0	15	92.0	14	117	114
15.C	12	40.0	9	65.0	27	93.C	24	118	29
16.C	8	41.0	17	68.0	26	94.0	24	119	34
17.C	12	42.0	7	69.C	29	95.C	16	120	44
18.C	14	43.0	5	70.0	27	96.C	21	121	21
19.C	4	44.0	10	71.0	24	97.0	30	123	6
20.C	4	45.C	5	72.C	17	98.C	19	124	15
21.C	24	46.0	5	73.0	48	99.C	13	125	14
22.C	4	47.C	10	74.0	44	100.C	12	126	32
23.C	2	48.C	4	75.0	36	101.0	19	127	12
24.0	17	49.0	24	76.C	27	102.C	7	128	24
25.C	24	50.0	15	77.0	19	103.C	5	129	26
26.C	12	51.C	46	78.C	30	104.0	16	130	10
27.C	29	52.C	84	79.0	61	105.0	5	131	21
28.C	20	53.0	47	80.0	16	106.C	5	132	26
29.C	37	54.0	16	81.0	10	107.0	10	133	28
30.C	28	55.C	37	82.C	22	108.C	10	134	6
31.C	29	56.0	41	83.C	17	109.C	21	135	30
32.C	42	57.0	48	85.0	7	110.C	36	136	9
33.C	25	58.C	40	86.0	7	111.0	17	137	6
34.0	21	59.C	4	87.0	23	112.C	8	138	19
								139	49
								140	59
								141	4
								142	4
								144	2
								146	7
								147	2

ING 6, F. P. HYDROSTATIC, MAXIMUM STRESS, 1750 IN./MIN., 800 PSI

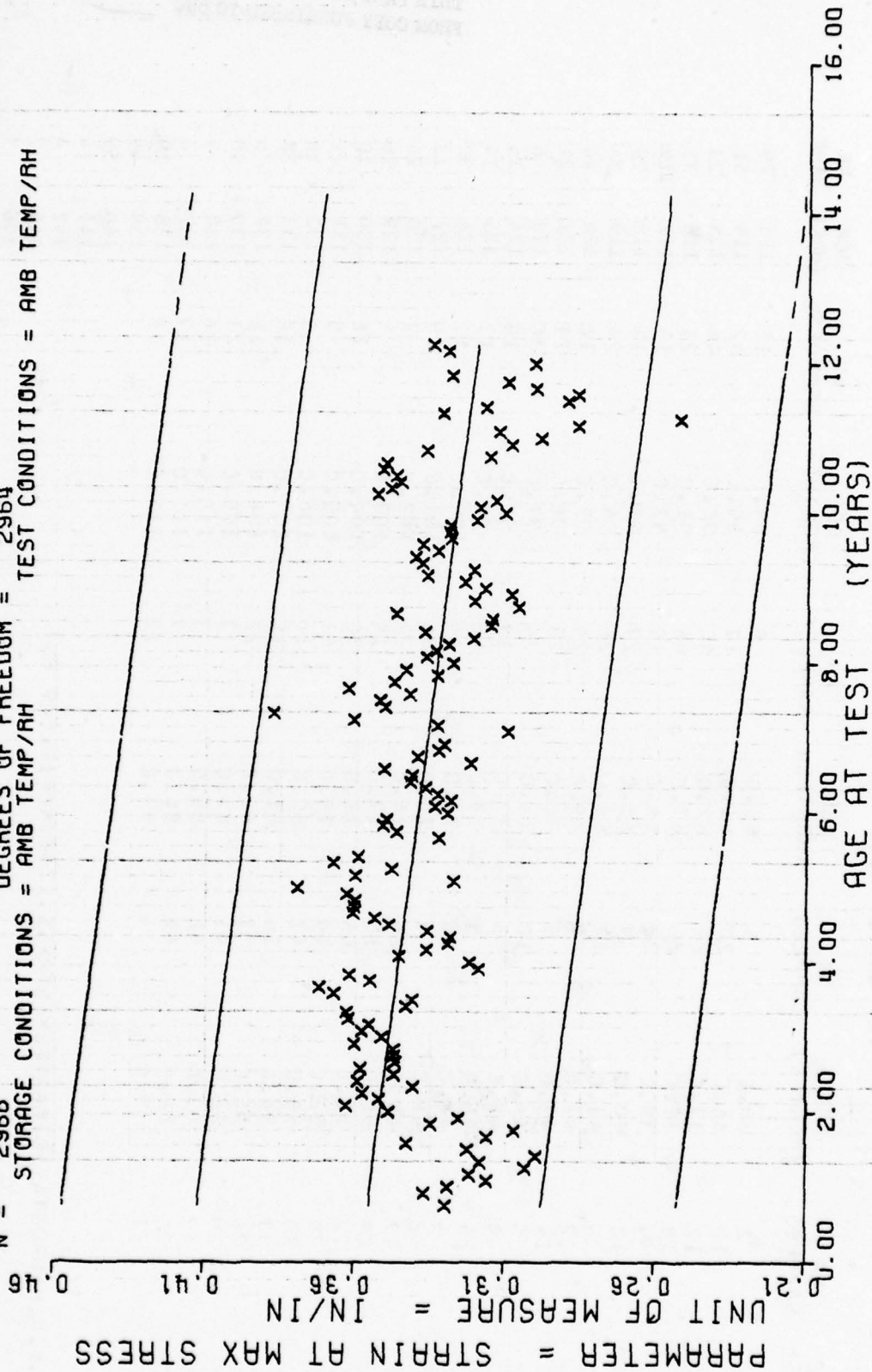
this sample size summary is applicable to figures 21 thru 25

MAXIMUM  $\epsilon$ , F. R. HYDROSTATIC, MAXIMUM STRESS, 1750 IN./MIN., 800 PSI

This sample size summary is applicable to figures 21 thru 25



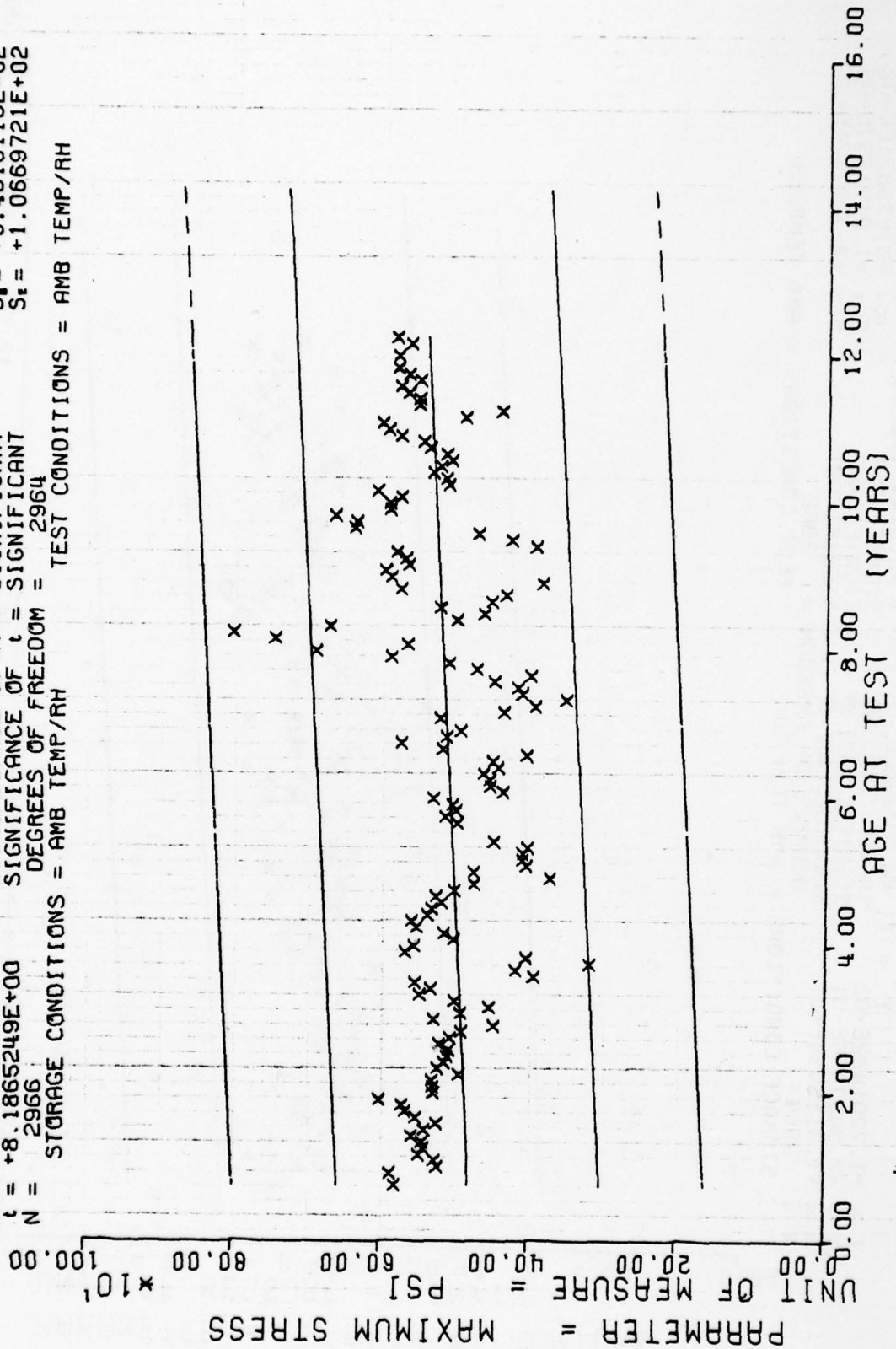
$Y = ((+3.5740130E-01) + (-2.5926457E-04) * X)$   
 $F = +2.1989147E+02$  SIGNIFICANCE OF F = SIGNIFICANT  
 $R = -2.6279982E-01$  SIGNIFICANCE OF R = SIGNIFICANT  
 $t = +1.4828738E+01$  SIGNIFICANCE OF t = SIGNIFICANT  
 $N = 2966$  DEGREES OF FREEDOM = 2964  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6,H.R.HYDROSTATIC,STRAIN AT MAX STRESS,1750IN/MIN,800 PSI

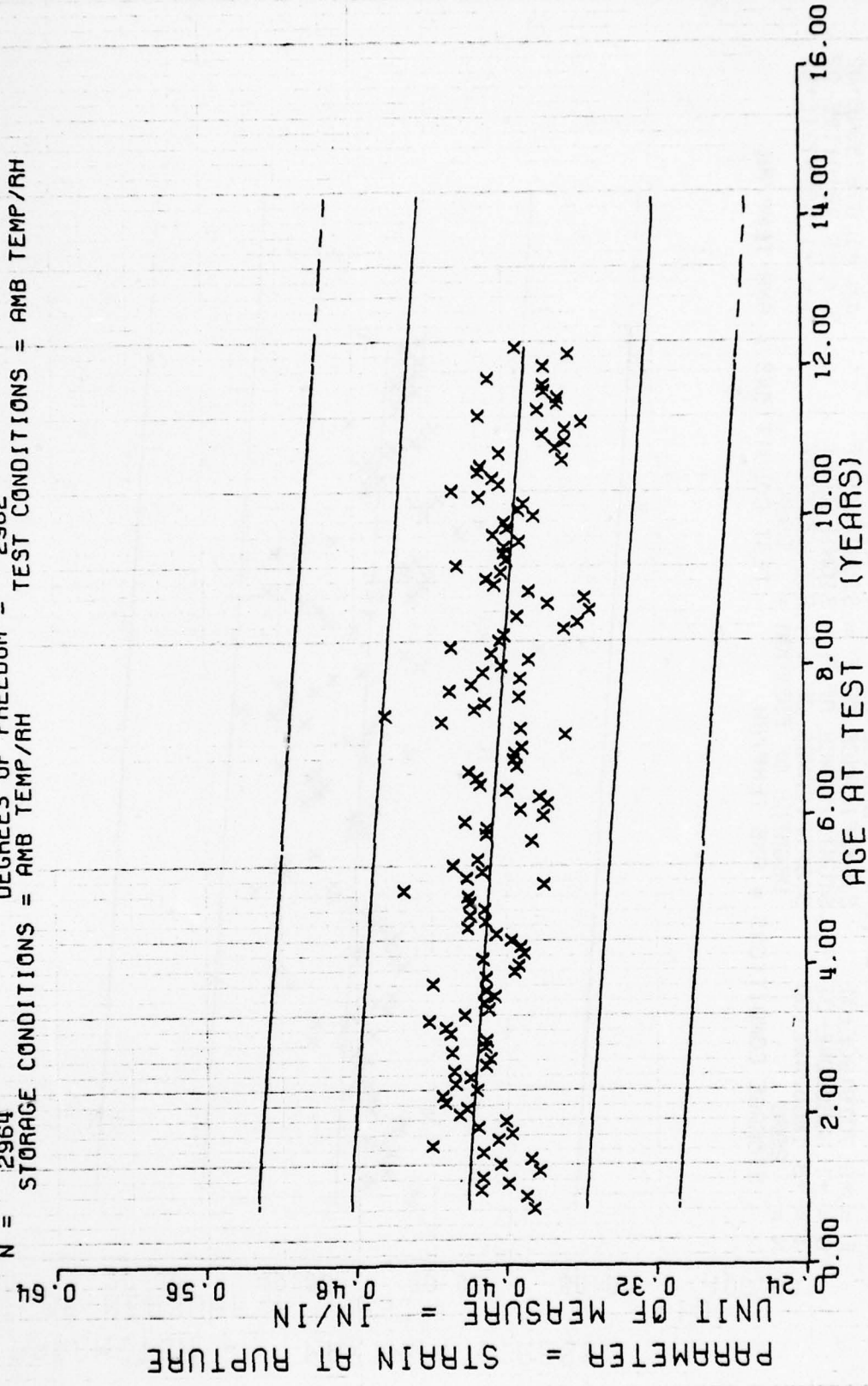
Figure 21

$Y = ((+4.7665513E+02) + (+4.4870440E-01) \times X)$   
 $F = +6.7019190E+01$  SIGNIFICANCE OF F = SIGNIFICANT  
 $R = +1.4869804E-01$  SIGNIFICANCE OF R = SIGNIFICANT  
 $t = +8.1865249E+00$  SIGNIFICANCE OF t = SIGNIFICANT  
 $N = 2966$  DEGREES OF FREEDOM = 2964  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6, H. R. HYDROSTATIC, MAXIMUM STRESS, 1750 IN/MIN, 800 PSI

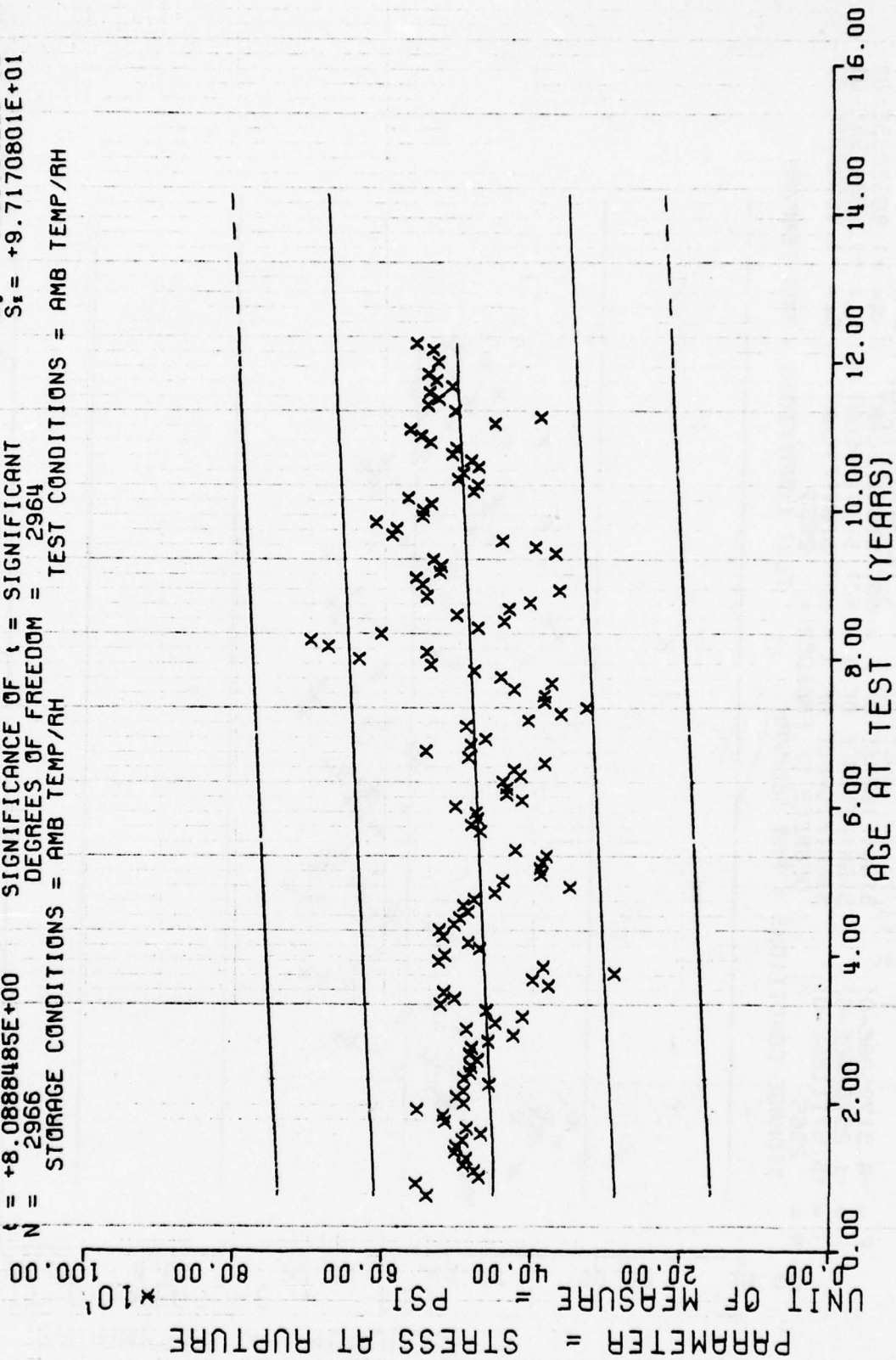
$F = +1.7201462E+02$  SIGNIFICANCE OF F = SIGNIFICANT  
 $R = -2.3427836E-01$  SIGNIFICANCE OF R = SIGNIFICANT  
 $t = +1.3115434E+01$  SIGNIFICANCE OF t = SIGNIFICANT  
 $N = 2964$  DEGREES OF FREEDOM = 2962  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6, H. R. HYDROSTATIC, STRAIN AT RUPTURE, 1750 IN/MIN, 800 PSI

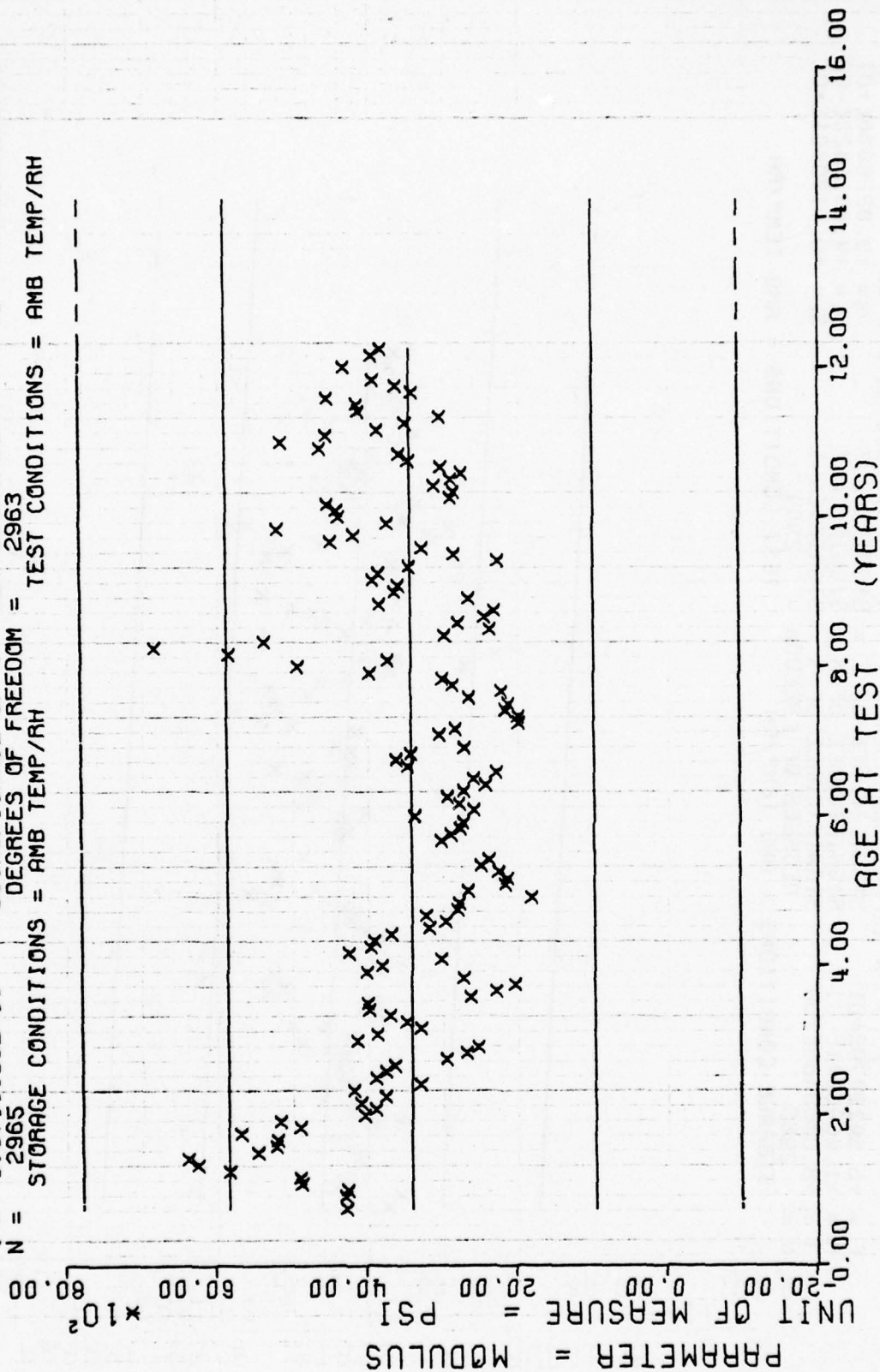


$Y = ((+4.4582183E+02) + (+4.0376638E-01) \times X)$   
 $F = +6.5429470E+01$  SIGNIFICANCE OF F = SIGNIFICANT  
 $R = +1.4696241E-01$  SIGNIFICANCE OF R = SIGNIFICANT  
 $t = +8.0888485E+00$  SIGNIFICANCE OF t = SIGNIFICANT  
 $N = 2966$  DEGREES OF FREEDOM = 2964  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6, H. R. HYDROSTATIC, STRESS AT RUPTURE, 1750 IN/MIN, 800 PSI

$Y = ((+3.3774306E+03) + (+4.9470137E-01) * X)$   
 $F = +4.3179599E-01$  SIGNIFICANCE OF F = NOT SIGNIFICANT  $G = +1.4653233E+03$   
 $R = +1.2070960E-02$  SIGNIFICANCE OF R = NOT SIGNIFICANT  $S_0 = +7.5284194E-01$   
 $t = +6.5711186E-01$  SIGNIFICANCE OF t = NOT SIGNIFICANT  $S_t = +1.4654638E+03$   
 $N = 2965$  DEGREES OF FREEDOM = 2963  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



WING 6, H.A. HYDROSTATIC MODULUS, 1750 IN/MIN, 800 PSI

Figure 25

\*\*\* SAMPLE SIZE SUMMARY \*\*\*

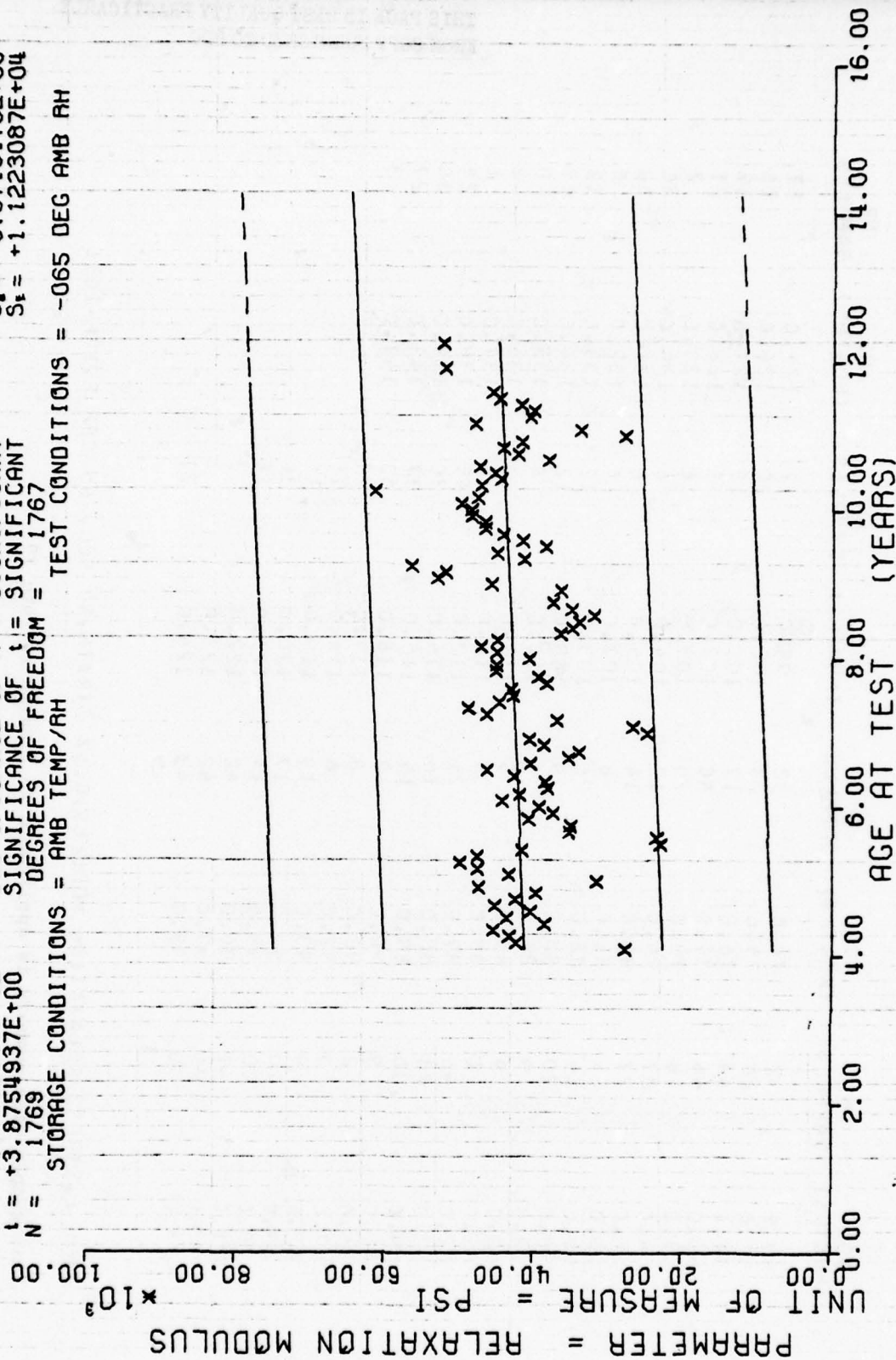
AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES
49.0	2	74.0	32	99.0	32	125.0	17
50.0	26	75.0	23	100.0	20	126.0	18
51.0	49	76.0	17	101.0	18	127.0	12
52.0	46	77.0	40	102.0	5	128.0	21
53.0	18	78.0	25	103.0	6	129.0	2
54.0	27	79.0	12	104.0	6	130.0	30
55.0	27	80.0	14	105.0	6	131.0	30
56.0	21	81.0	8	107.0	6	132.0	8
57.0	24	82.0	26	108.0	12	133.0	12
58.0	20	83.0	9	109.0	12	134.0	19
59.0	9	84.0	5	110.0	6	135.0	9
60.0	9	85.0	6	111.0	3	136.0	2
61.0	21	86.0	3	112.0	8	137.0	6
62.0	46	87.0	21	113.0	45	138.0	28
63.0	23	88.0	16	114.0	30	139.0	39
64.0	30	89.0	15	115.0	37	140.0	27
65.0	9	90.0	12	116.0	32	141.0	3
66.0	2	91.0	8	117.0	27	142.0	
67.0	9	92.0	6	118.0	15		
68.0	9	93.0	19	119.0	19		
69.0	20	94.0	17	120.0	30		
70.0	30	95.0	17	121.0	18		
71.0	41	96.0	42	122.0	3		
72.0	30	97.0	42	123.0	3		
73.0	39	98.0	43	124.0	21		

WING 6, STRESS RELAXATION MODULUS, 0.5% STRAIN, 10 SEC, -65 DEG F, TPT-1011

This sample size summary is applicable to figures 26 thru 29

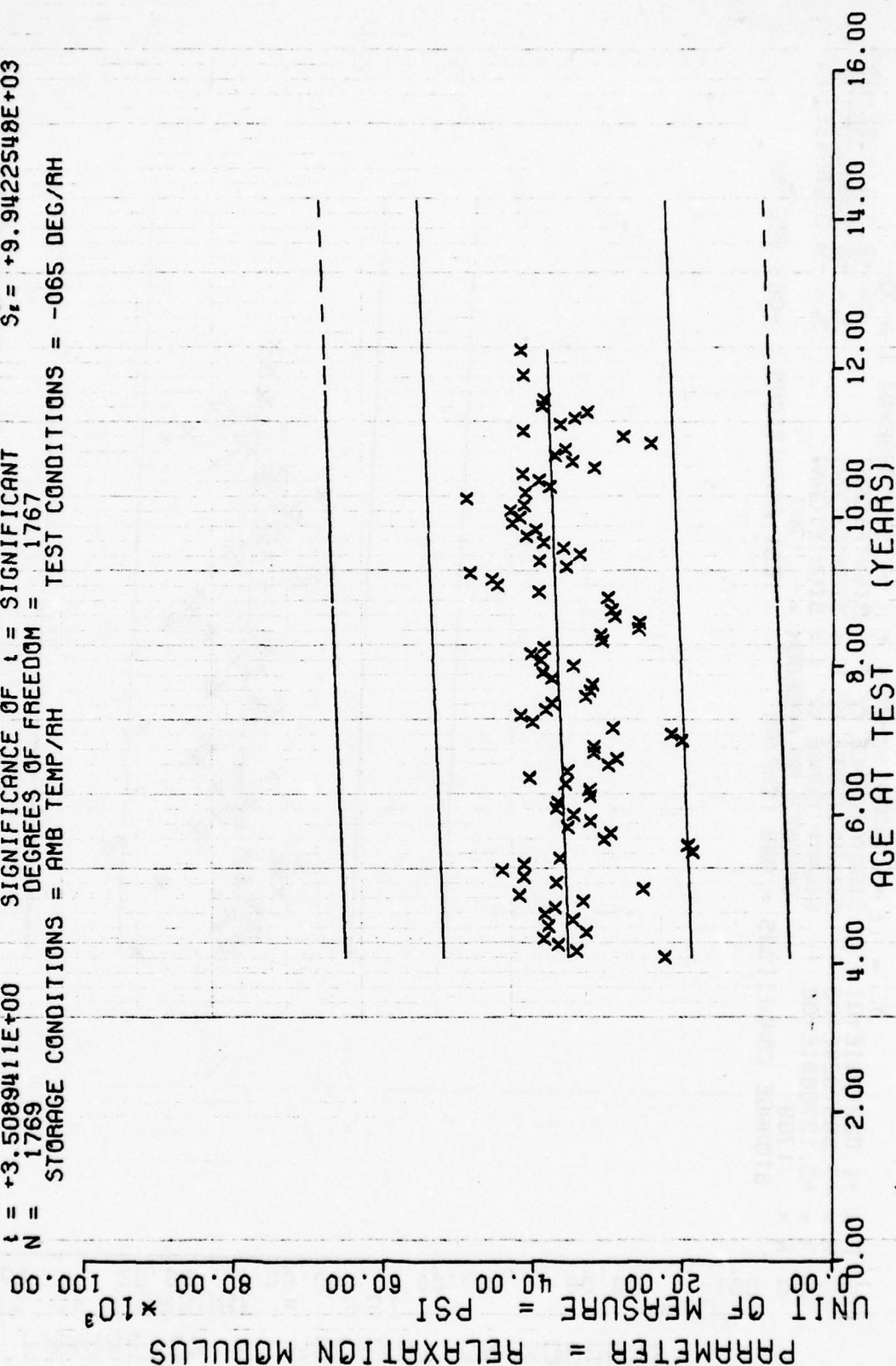


$Y = (( +3.9606025E+04 ) + ( +3.7481129E+01 ) * X)$   
 $F = +1.5019451E+01$  SIGNIFICANCE OF F = SIGNIFICANT  
 $R = +9.1805947E-02$  SIGNIFICANCE OF R = SIGNIFICANT  
 $t = +3.8754937E+00$  SIGNIFICANCE OF t = SIGNIFICANT  
 $N = 1769$  DEGREES OF FREEDOM = 1767  
 STORAGE CONDITIONS = AMB TEMP/AM TEST CONDITIONS = -065 DEG AMB RH



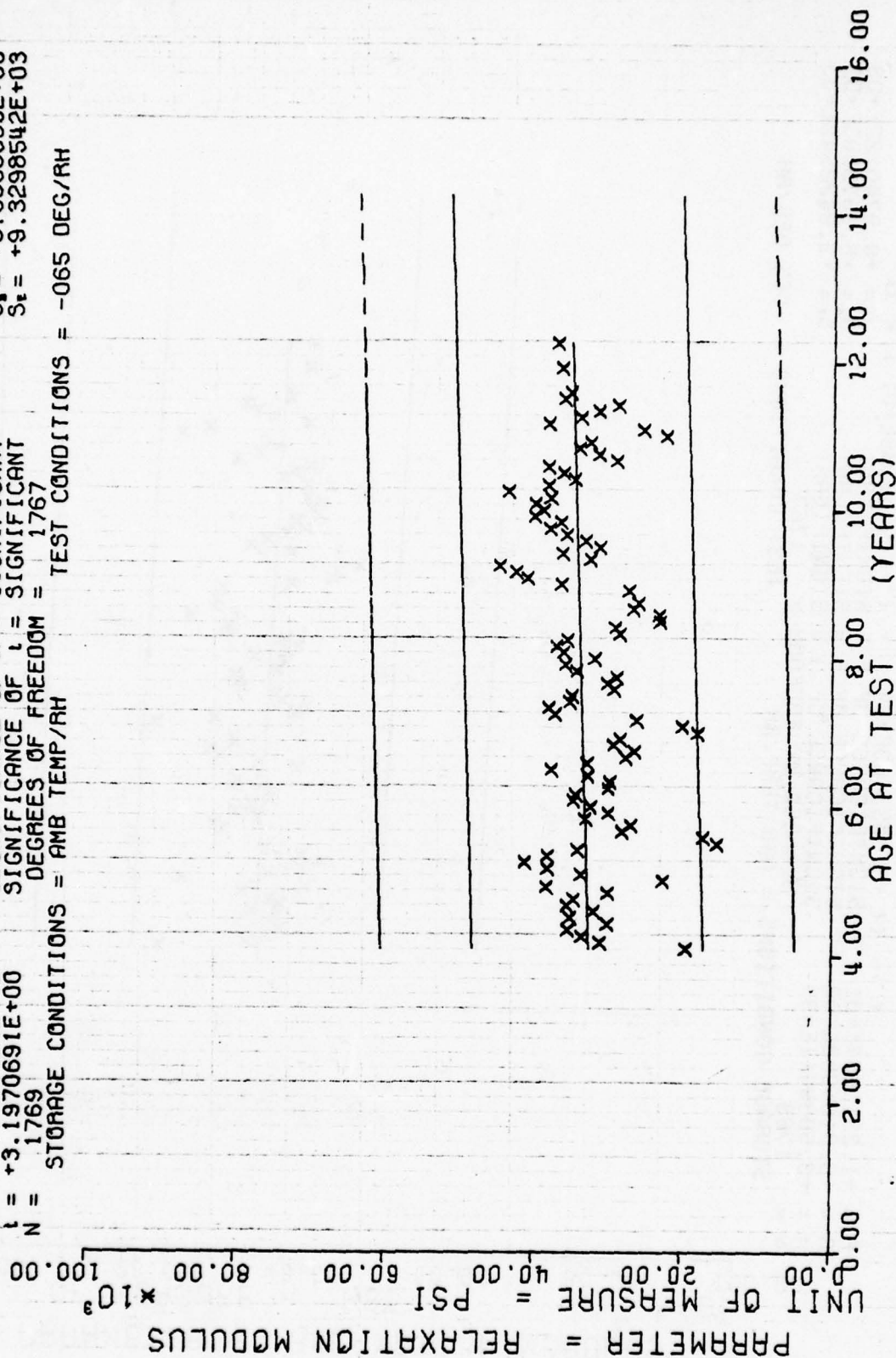
WING 6, STRESS RELAXATION MODULUS, 0.5% STRAIN, 10 SEC, -65 DEG F, TPH-1011

$Y = ((+3.3953446E+04) + (+3.0063135E+01) * X)$   
 $F = +1.2312667E+01$  SIGNIFICANCE OF F = SIGNIFICANT  $G_1 = +9.9740122E+03$   
 $R = +8.3185943E-02$  SIGNIFICANCE OF R = SIGNIFICANT  $S_0 = +8.5675803E+00$   
 $t = +3.5089411E+00$  SIGNIFICANCE OF t = SIGNIFICANT  $S_z = +9.9422548E+03$   
 $N = 1769$  DEGREES OF FREEDOM = 1767  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = -065 DEG/RH



WING 6 STRESS RELAXATION MODULUS, 0.5% STRAIN, 50 SEC, -65 DEG F, TPH-1011

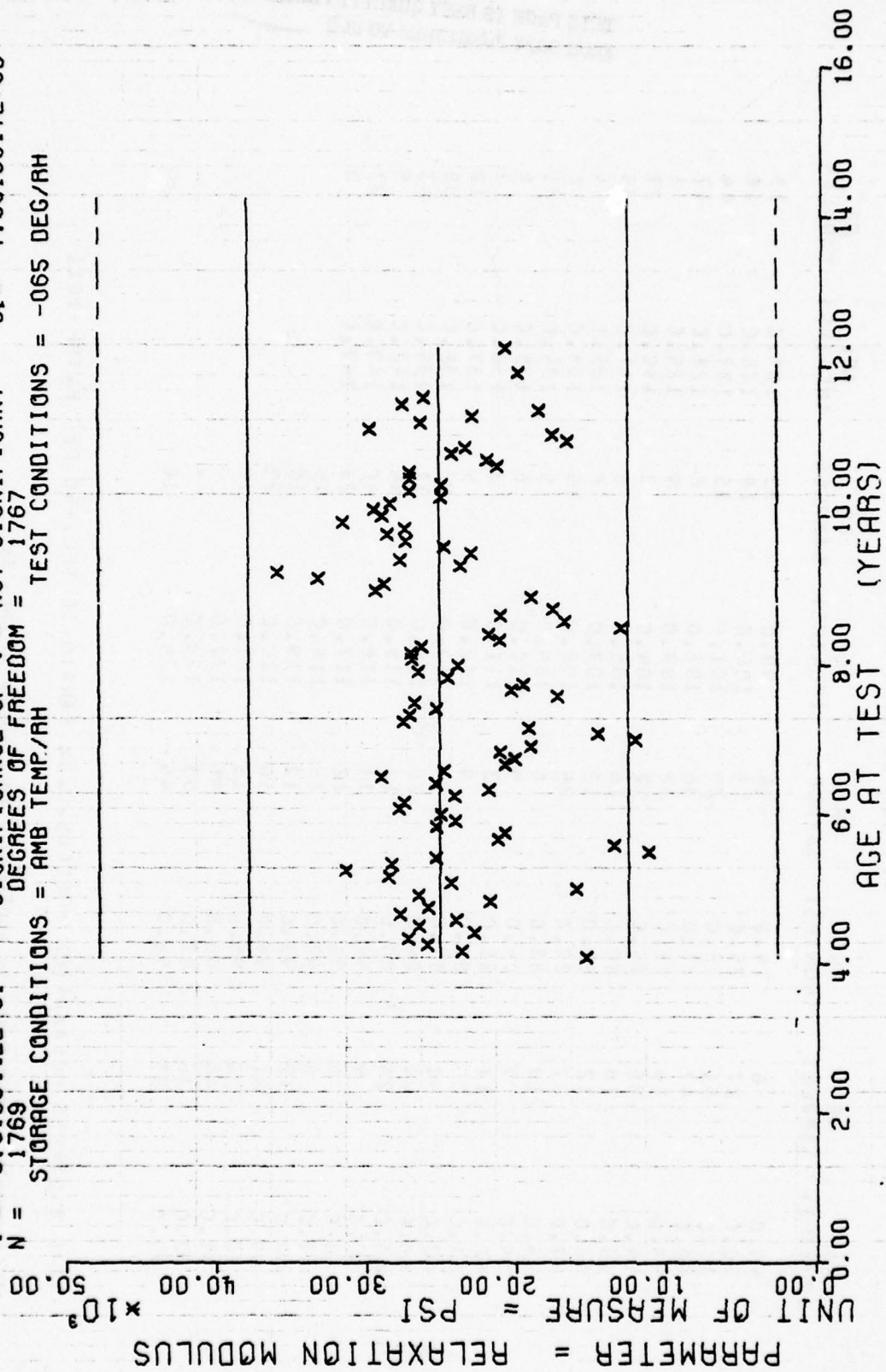
$F = +1.0221251E+01$   
 $R = +7.5837024E-02$   
 $l = +3.1970691E+00$   
 $N = 1769$   
 $Y = ((+3.1497468E+04) + (+2.5703969E+01) * X)$   
 SIGNIFICANCE OF F = SIGNIFICANT  
 SIGNIFICANCE OF R = SIGNIFICANT  
 SIGNIFICANCE OF l = SIGNIFICANT  
 DEGREES OF FREEDOM = 1767  
 STORAGE CONDITIONS = AMB TEMP/RH  
 TEST CONDITIONS = -065 DEG/RH



WING 6 STRESS RELAXATION MODULUS, 0.5% STRAIN, 100 SEC, -65 DEG F, TPH-1011



$F = +1.2343587E-01$   
 $R = +8.3577093E-03$   
 $l = +3.5133442E-01$   
 $N = 1769$   
 $Y = ((+2.5172696E+04) + ((+2.2863689E+00) * X)$   
 SIGNIFICANCE OF F = NOT SIGNIFICANT  
 SIGNIFICANCE OF R = NOT SIGNIFICANT  
 SIGNIFICANCE OF l = NOT SIGNIFICANT  
 DEGREES OF FREEDOM = 1767  
 STORAGE CONDITIONS = AMB TEMP/AH  
 TEST CONDITIONS = -065 DEG/AH



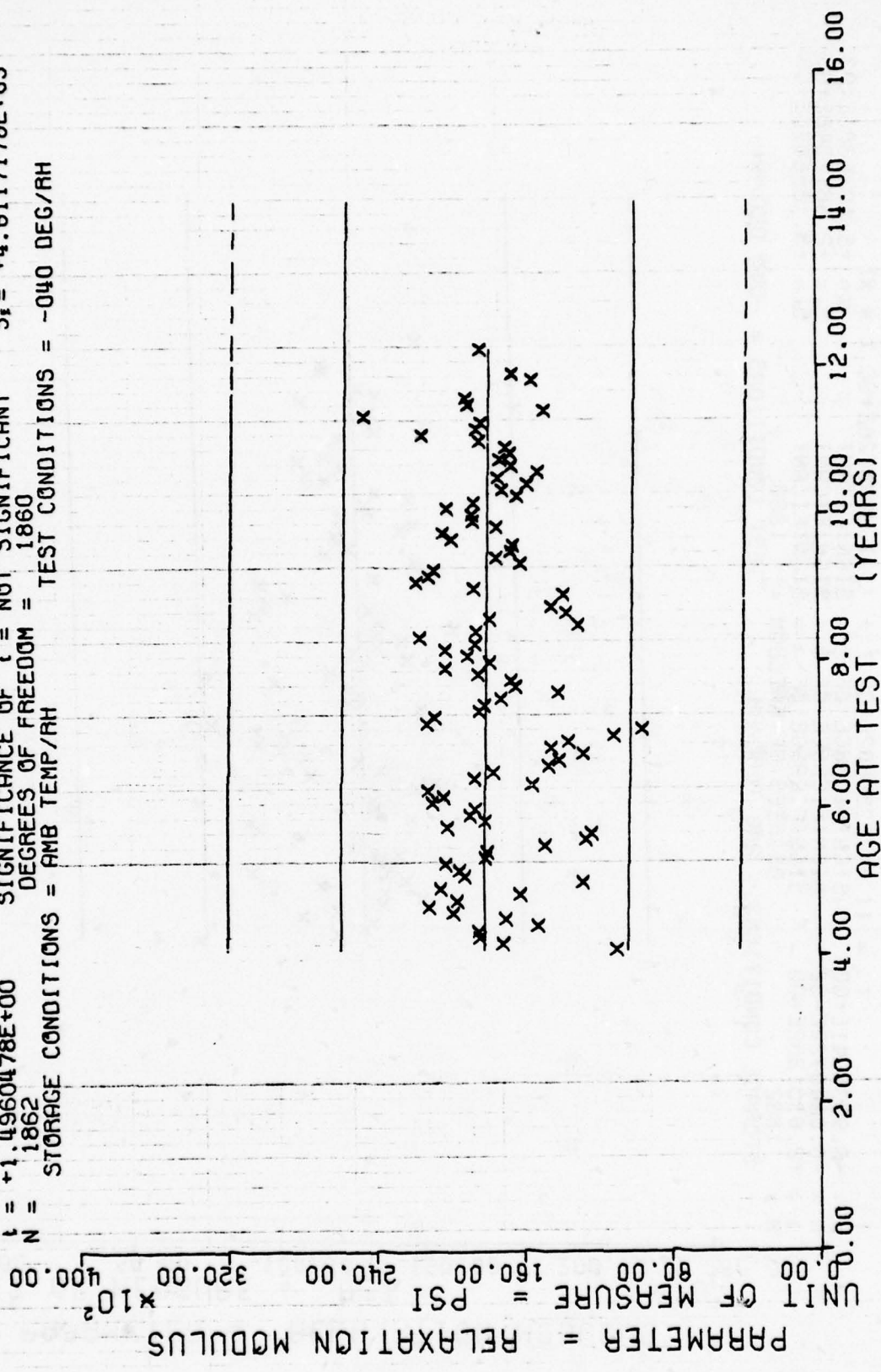
\*\*\* SAMPLE SIZE SUMMARY \*\*\*

AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES
49.C	6	74.0	34	99.0	22	125.C	13
50.C	27	75.0	19	100.0	18	126.C	16
51.C	51	76.0	29	101.0	15	127.C	44
52.C	47	77.0	36	102.0	6	128.C	17
53.C	14	78.0	32	103.0	9	129.C	1
54.C	30	79.0	12	104.0	3	130.C	27
55.C	18	80.0	16	105.0	6	131.C	39
56.0	12	81.0	12	107.0	6	132.C	9
57.C	27	82.0	24	108.0	15	133.0	6
58.C	19	83.0	6	109.C	9	134.0	31
59.C	9	84.0	9	110.0	6	135.C	6
60.C	12	85.0	3	111.0	3	136.0	3
61.C	20	86.0	9	112.C	5	137.0	12
62.C	48	87.0	15	113.0	52	138.C	38
63.C	24	88.0	20	114.0	31	139.C	45
64.C	24	89.C	12	115.0	48	142.C	9
65.0	9	90.C	11	116.0	40	143.C	21
66.C	6	91.0	12	117.0	21	147.C	3
67.C	6	92.C	15	118.0	15		
68.0	12	93.C	12	119.C	15		
69.C	21	94.0	16	120.C	23		
70.C	30	95.0	15	121.0	18		
71.C	44	96.0	48	122.0	3		
72.C	36	97.0	53	123.0	5		
73.C	35	98.0	45	124.0	10		

WING 6, STRESS RELAXATION MODULUS, 0.5% STRAIN, 1C SEC, -4C DEG F, IPT-1011

This sample size summary is applicable to figures 30 thru 33

$Y = ((+1.846443E+04) + (-5.7582812E+00) * X)$   
 $F = +2.2381591E+00$  SIGNIFICANCE OF F = NOT SIGNIFICANT  $S_y = +4.6132516E+03$   
 $R = -3.4667927E-02$  SIGNIFICANCE OF R = NOT SIGNIFICANT  $S_e = +3.8489953E+00$   
 $t = +1.4960478E+00$  SIGNIFICANCE OF t = NOT SIGNIFICANT  $S_t = +4.6117178E+03$   
 $N = 1862$  DEGREES OF FREEDOM = 1860  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = -040 DEG/RH

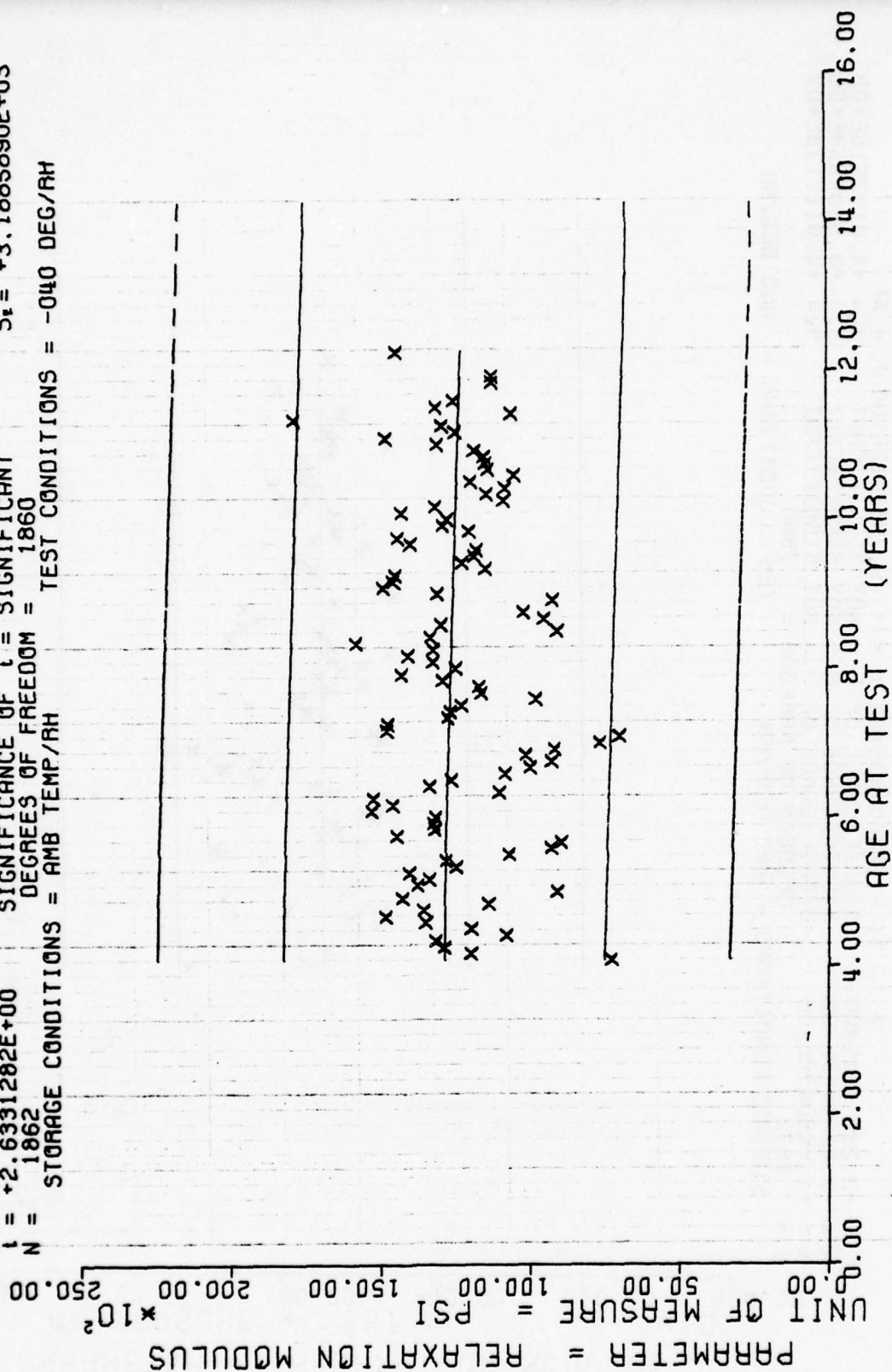


WING 6, STRESS RELAXATION MODULUS, 0.5% STRAIN, 10 SEC, -40 DEG F, TPH-1011

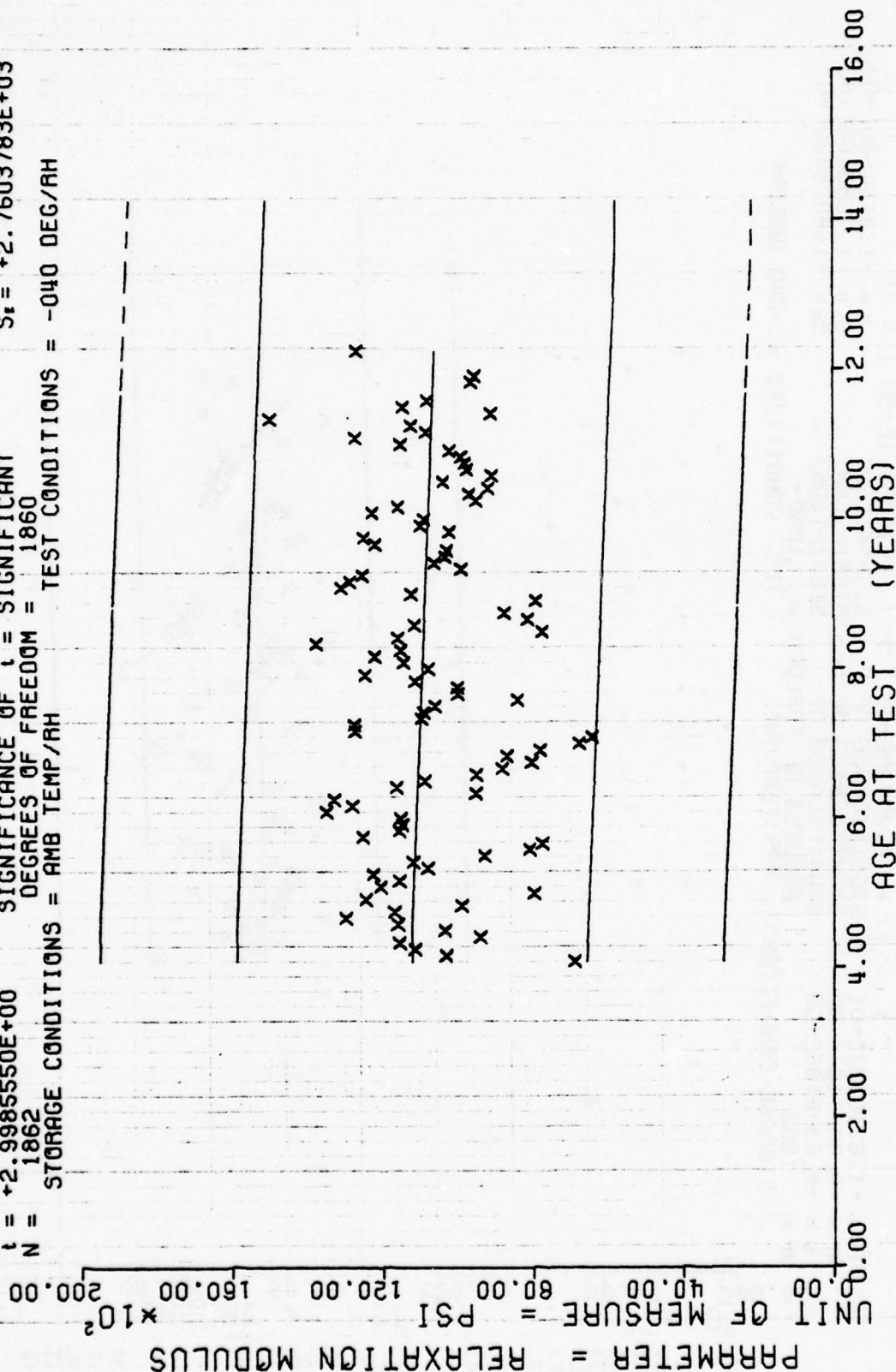
Figure 30



$Y = (( +1.3235602E+04 ) + ( -7.0073726E+00 ) * X )$   
 $F = +6.9333641E+00$  SIGNIFICANCE OF F = SIGNIFICANT  $S_1 = +3.1936680E+03$   
 $R = -6.0940722E-02$  SIGNIFICANCE OF R = SIGNIFICANT  $S_2 = +2.6612348E+00$   
 $t = +2.6331282E+00$  SIGNIFICANCE OF t = SIGNIFICANT  $S_3 = +3.1885890E+03$   
 $N = 1862$  DEGREES OF FREEDOM = 1860  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = -040 DEG/RH

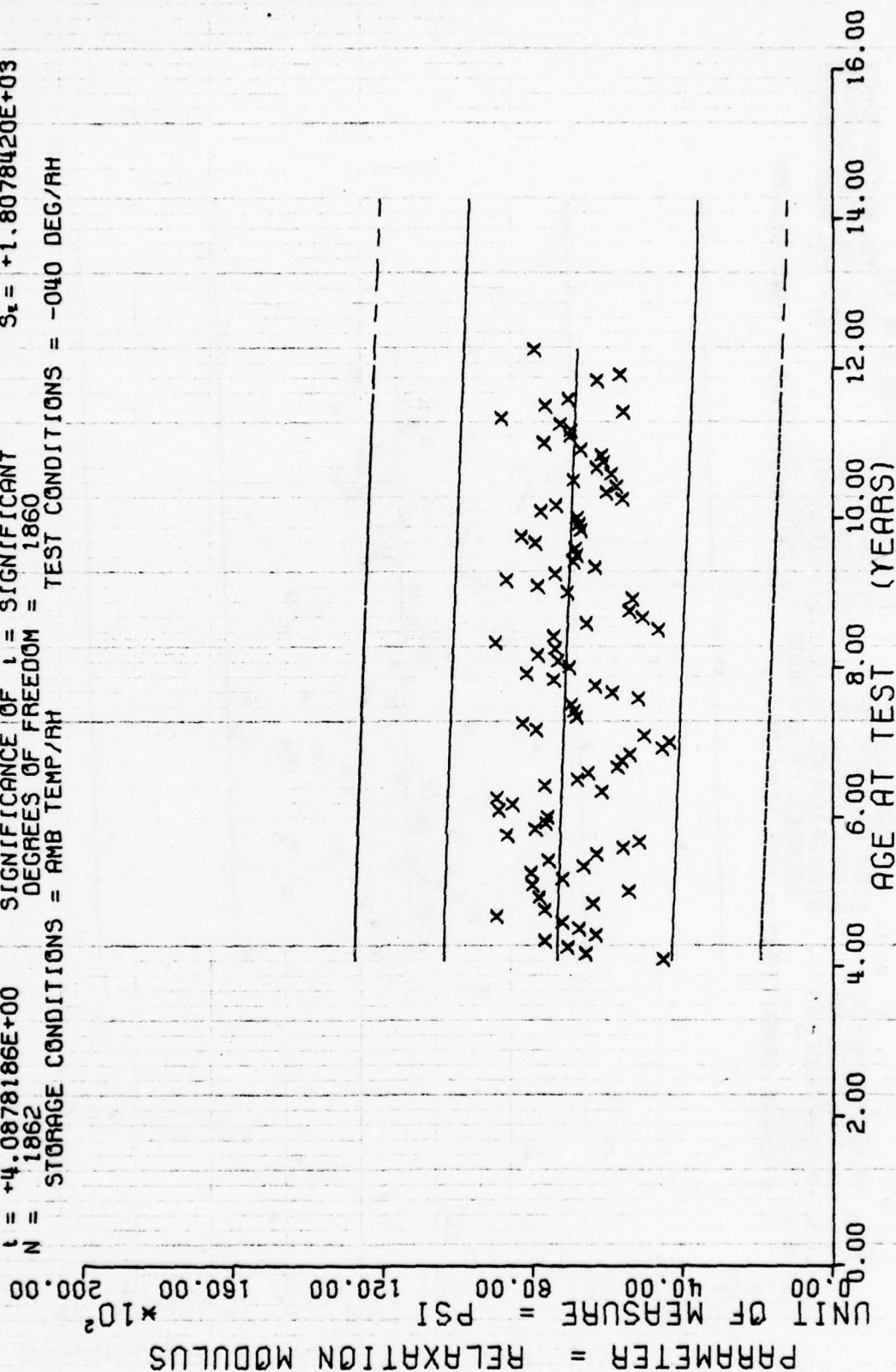


$Y = ((+1.1580896E+04) + (-6.9082064E+00) \times X)$   
 SIGNIFICANCE OF F = SIGNIFICANT  
 SIGNIFICANCE OF R = SIGNIFICANT  
 SIGNIFICANCE OF t = SIGNIFICANT  
 DEGREES OF FREEDOM = 1860  
 N = 1862  
 STORAGE CONDITIONS = AMB TEMP/AH  
 TEST CONDITIONS = -040 DEG/AH  
 $\sigma_r = +2.7662987E+03$   
 $S_r = +2.3038451E+00$   
 $S_t = +2.7603783E+03$



WING 6, STRESS RELAXATION MODULUS, 0.5% STRAIN, 100 SEC, -40 DEG F, TPH-1011

$F = +1.6710261E+01$   
 $R = -9.4361101E-02$   
 $t = +4.0878186E+00$   
 $N = 1862$   
 $Y = (( +7.6787028E+03 ) + ( -6.1678921E+00 ) * X)$   
 SIGNIFICANCE OF F = SIGNIFICANT  
 SIGNIFICANCE OF R = SIGNIFICANT  
 SIGNIFICANCE OF t = SIGNIFICANT  
 DEGREES OF FREEDOM = 1860  
 STORAGE CONDITIONS = AMB TEMP/AM TEST CONDITIONS = -040 DEG/AM





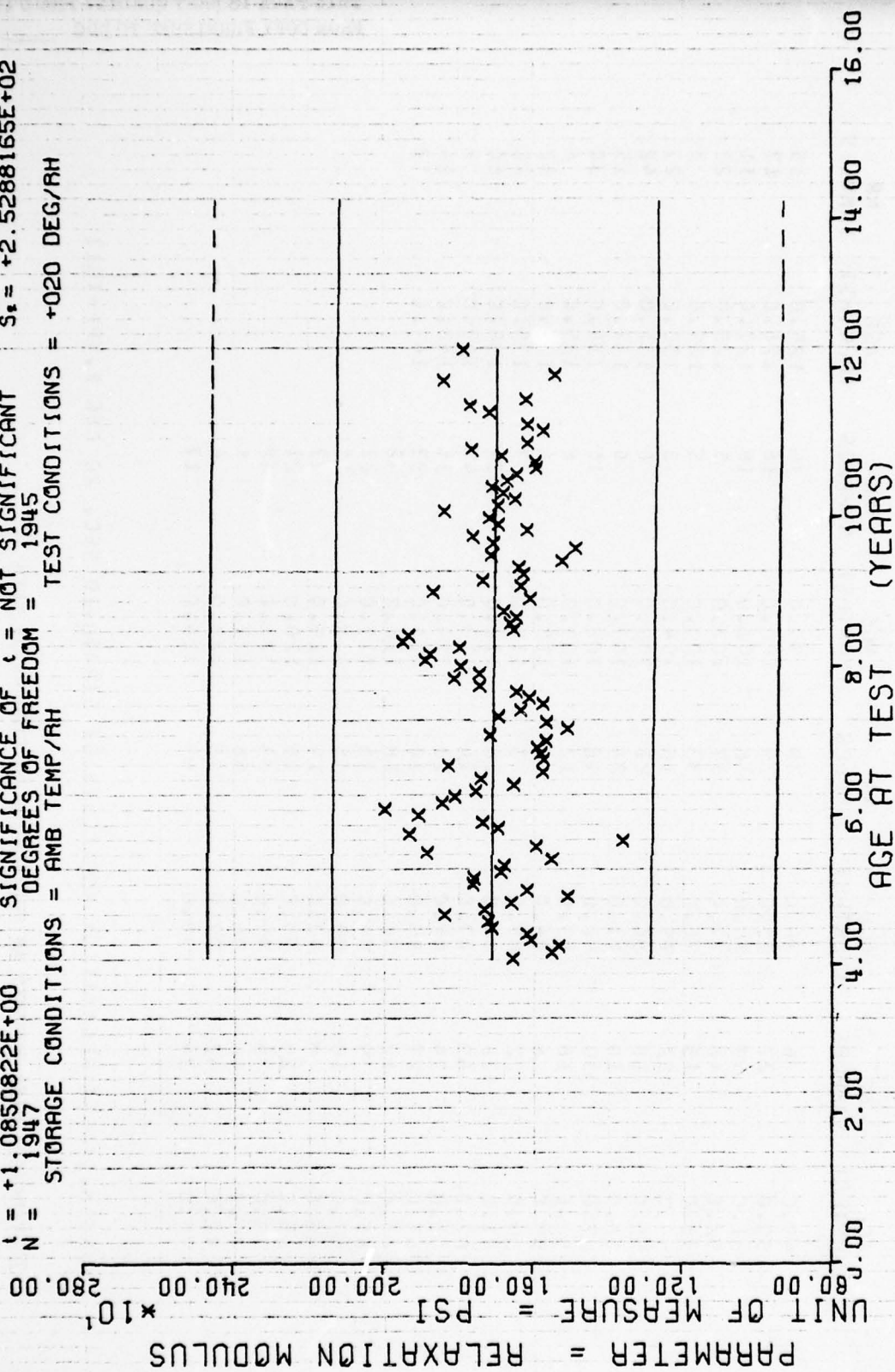
\*\*\* SAMPLE SIZE SUMMARY \*\*\*

AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES
49.0	6	74.0	39	99.0	36	125.0	15
50.0	27	75.0	29	100.0	18	126.0	17
51.0	59	76.0	26	101.0	16	127.0	11
52.0	48	77.0	37	102.0	5	128.0	21
53.0	15	78.0	33	103.0	5	129.0	3
54.0	32	79.0	15	104.0	3	130.0	27
55.0	18	80.0	21	105.0	6	131.0	42
56.0	18	81.0	24	107.0	5	132.0	15
57.0	30	82.0	18	108.0	15	134.0	30
58.0	16	83.0	12	109.0	6	135.0	6
59.0	6	84.0	9	110.0	6	137.0	12
60.0	22	85.0	3	111.0	3	138.0	20
61.0	21	86.0	18	112.0	24	139.0	60
62.0	49	87.0	14	113.0	47	142.0	6
63.0	24	88.0	21	114.0	35	143.0	14
64.0	27	89.0	18	115.0	32	147.0	3
65.0	12	90.0	18	116.0	42		
66.0	9	91.0	15	117.0	21		
67.0	10	92.0	15	118.0	15		
68.0	9	93.0	15	119.0	27		
69.0	29	94.0	15	120.0	21		
70.0	24	95.0	23	121.0	18		
71.0	46	96.0	48	122.0	6		
72.0	42	97.0	45	123.0	6		
73.0	24	98.0	45	124.0	17		

WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 10 SEC, 20 DEG F, TPT-1011

This sample size summary is applicable to figures 34 thru 37

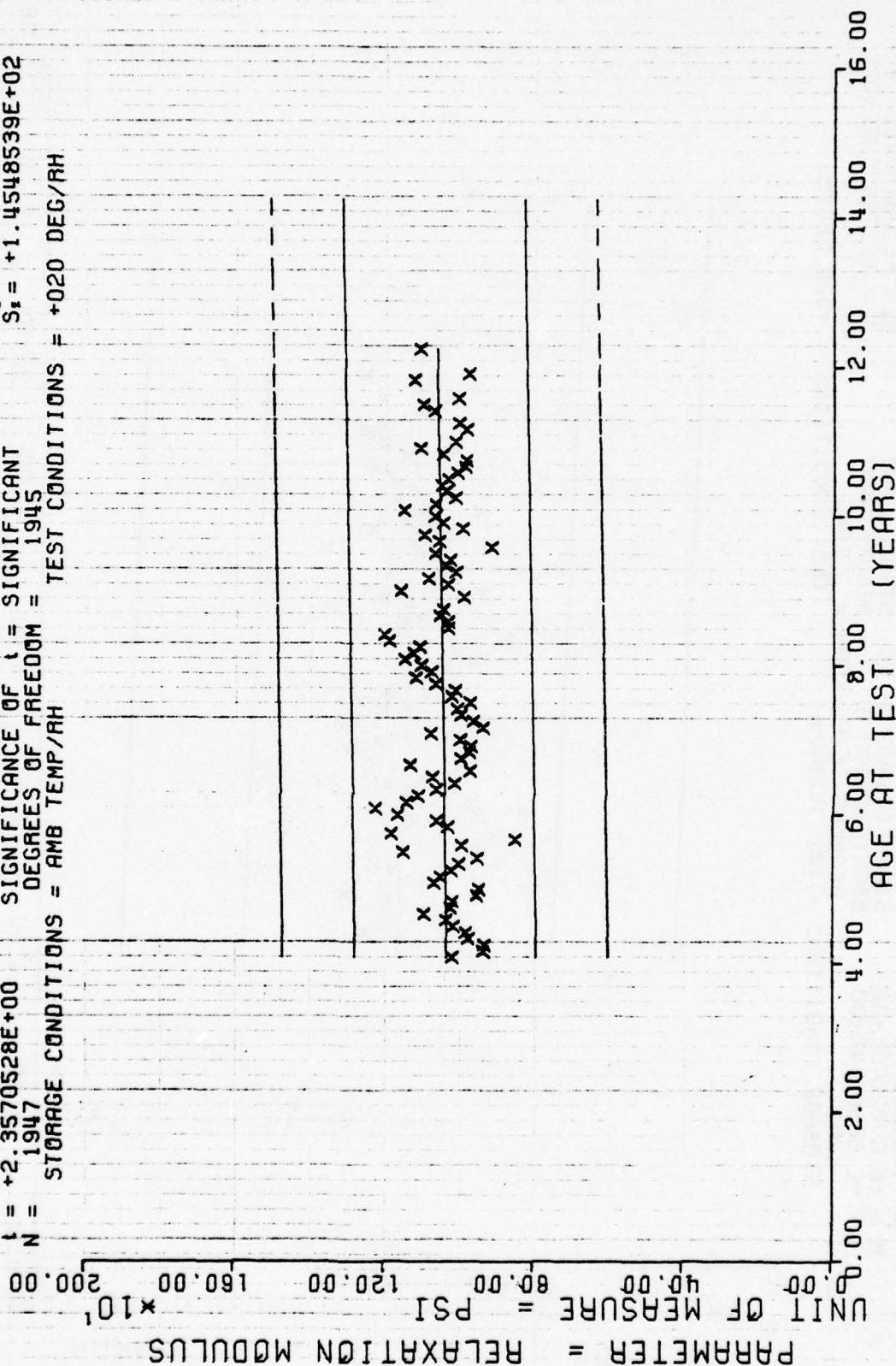
$Y = ((+1.7210419E+03) + (-2.2856097E-01) * X)$   
 $F = +1.1774035E+00$  SIGNIFICANCE OF F = NOT SIGNIFICANT  $G = +2.5289317E+02$   
 $R = -2.4596394E-02$  SIGNIFICANCE OF R = NOT SIGNIFICANT  $S_1 = +2.1063930E-01$   
 $t = +1.0850822E+00$  SIGNIFICANCE OF t = NOT SIGNIFICANT  $S_2 = +2.5288165E+02$   
 $N = 1947$  DEGREES OF FREEDOM = 1945  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +020 DEG/RH



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 10 SEC, 20 DEG F, TPH-1011

Figure 34

$F = +5.5556981E+00$   
 $R = +5.3369132E-02$   
 $t = +2.3570528E+00$   
 $N = 1947$   
 $Y = ((+1.0202564E+03) + (+2.8563460E-01) * X)$   
 SIGNIFICANCE OF F = SIGNIFICANT  
 SIGNIFICANCE OF R = SIGNIFICANT  
 SIGNIFICANCE OF t = SIGNIFICANT  
 DEGREES OF FREEDOM = 1945  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +020 DEG/RH

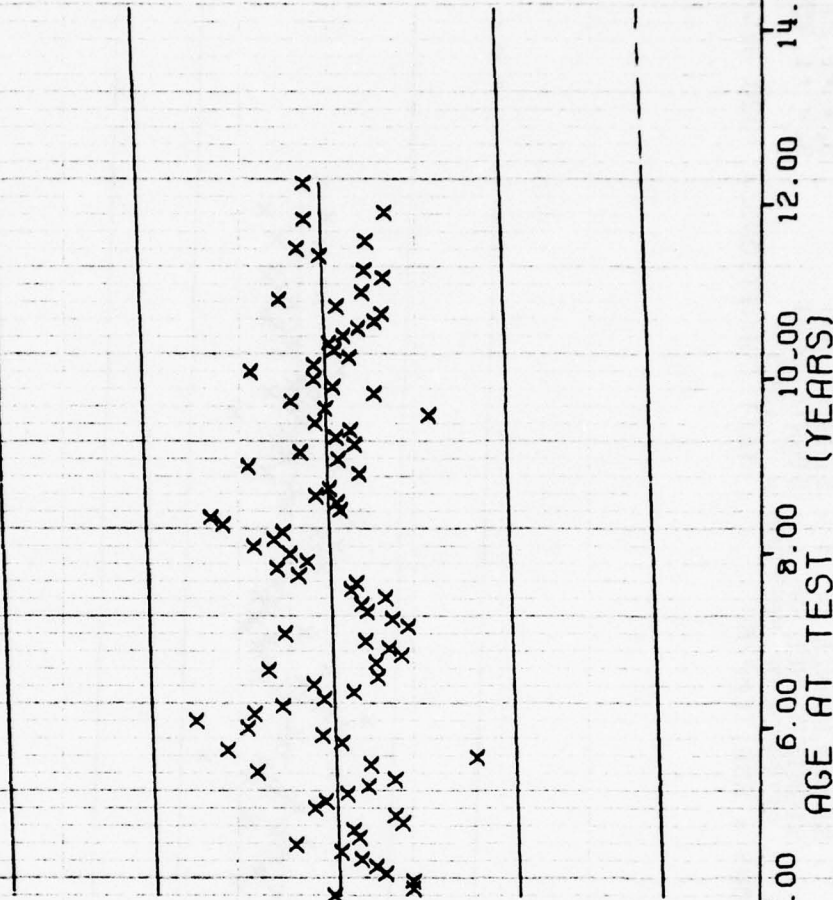


WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 50 SEC, 20 DEG F, TPH-1011



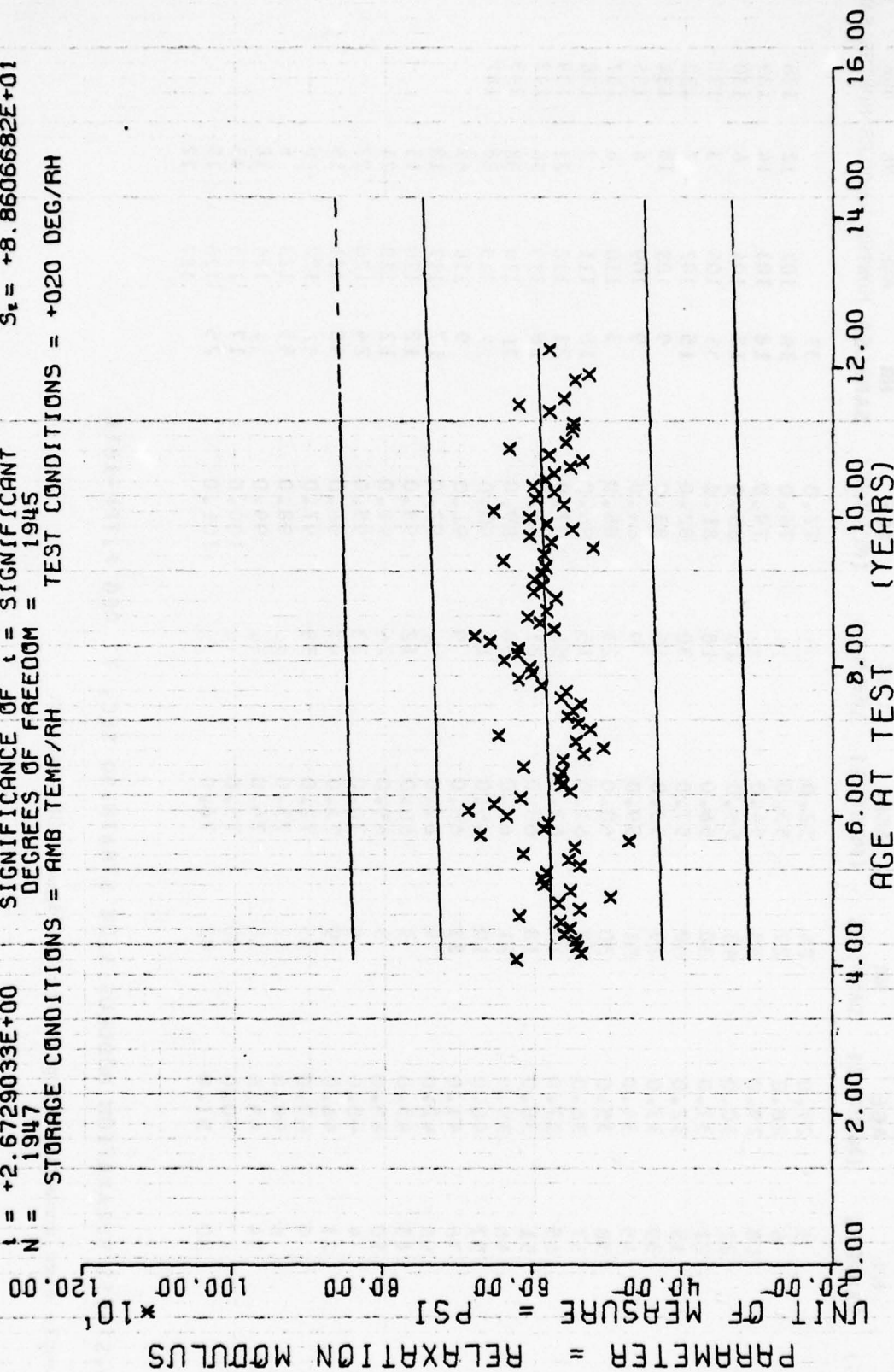
$F = +7.2125627E+00$   
 $R = +6.0782876E-02$   
 $t = +2.6856214E+00$   
 $N = 1947$   
 $Y = (( +8.6681283E+02 ) + ( +2.7711172E-01 ) * X)$   
 SIGNIFICANCE OF F = SIGNIFICANT  
 SIGNIFICANCE OF R = SIGNIFICANT  
 SIGNIFICANCE OF t = SIGNIFICANT  
 DEGREES OF FREEDOM = 1945  
 STORAGE CONDITIONS = AMB TEMP/RH  
 TEST CONDITIONS = +020 DEG/RH

PARAMETER = RELAXATION MODULUS  
 UNIT OF MEASURE = PSI  
 \*10<sup>10</sup>



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 100 SEC, 20 DEG F, TRH-1011

$Y = ((+5.6497105E+02) + (+1.9727489E-01) * X)$   
 $F = +7.1444122E+00$  SIGNIFICANCE OF F = SIGNIFICANT  $G_1 = +8.8746457E+01$   
 $R = +6.0496086E-02$  SIGNIFICANCE OF R = SIGNIFICANT  $S_1 = +7.3805474E-02$   
 $t = +2.6729033E+00$  SIGNIFICANCE OF t = SIGNIFICANT  $S_2 = +8.8606682E+01$   
 $N = 1947$  DEGREES OF FREEDOM = 1945  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +020 DEG/RH

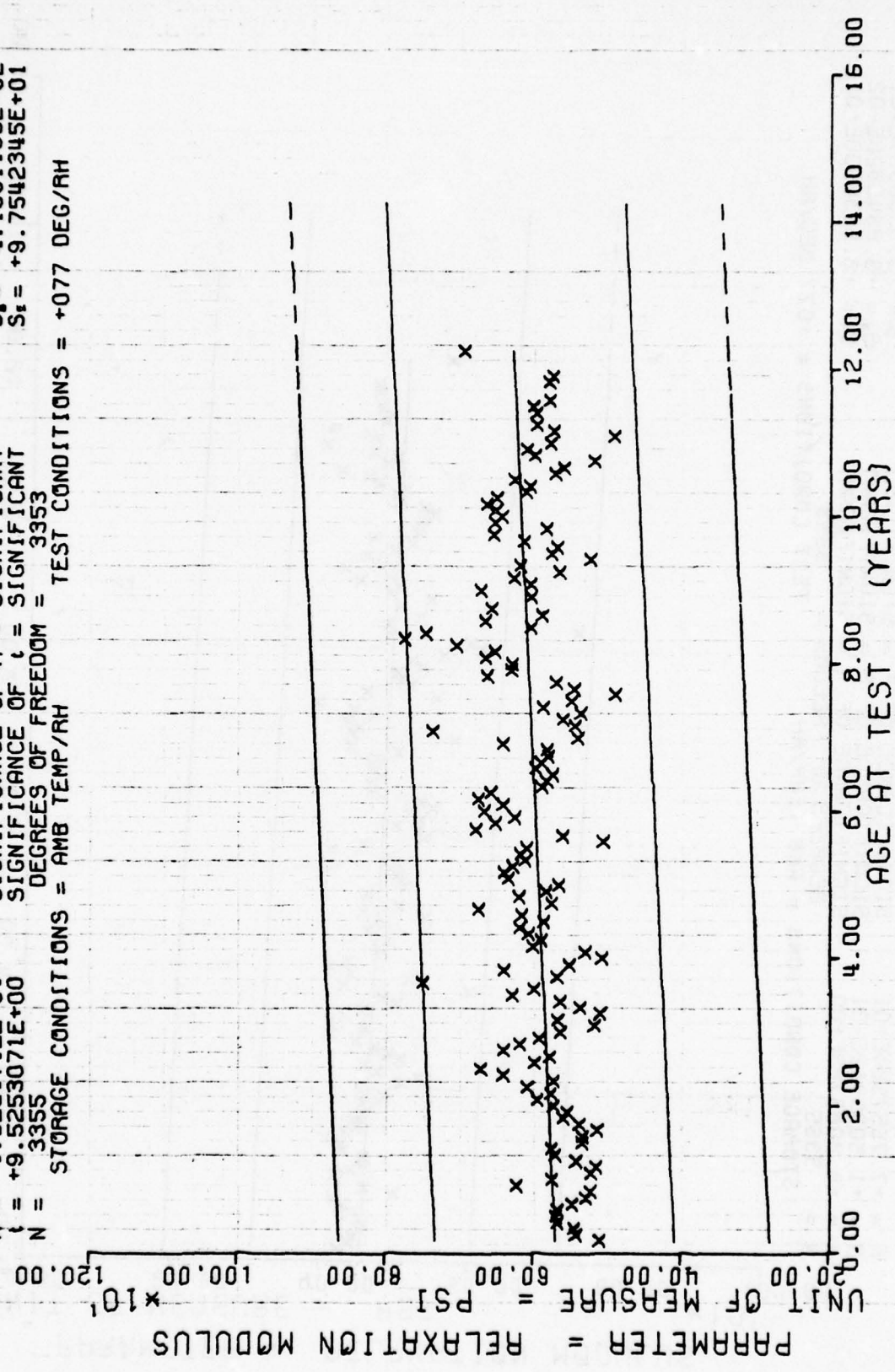


WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 1000 SEC, 20 DEG F, TRH-1011





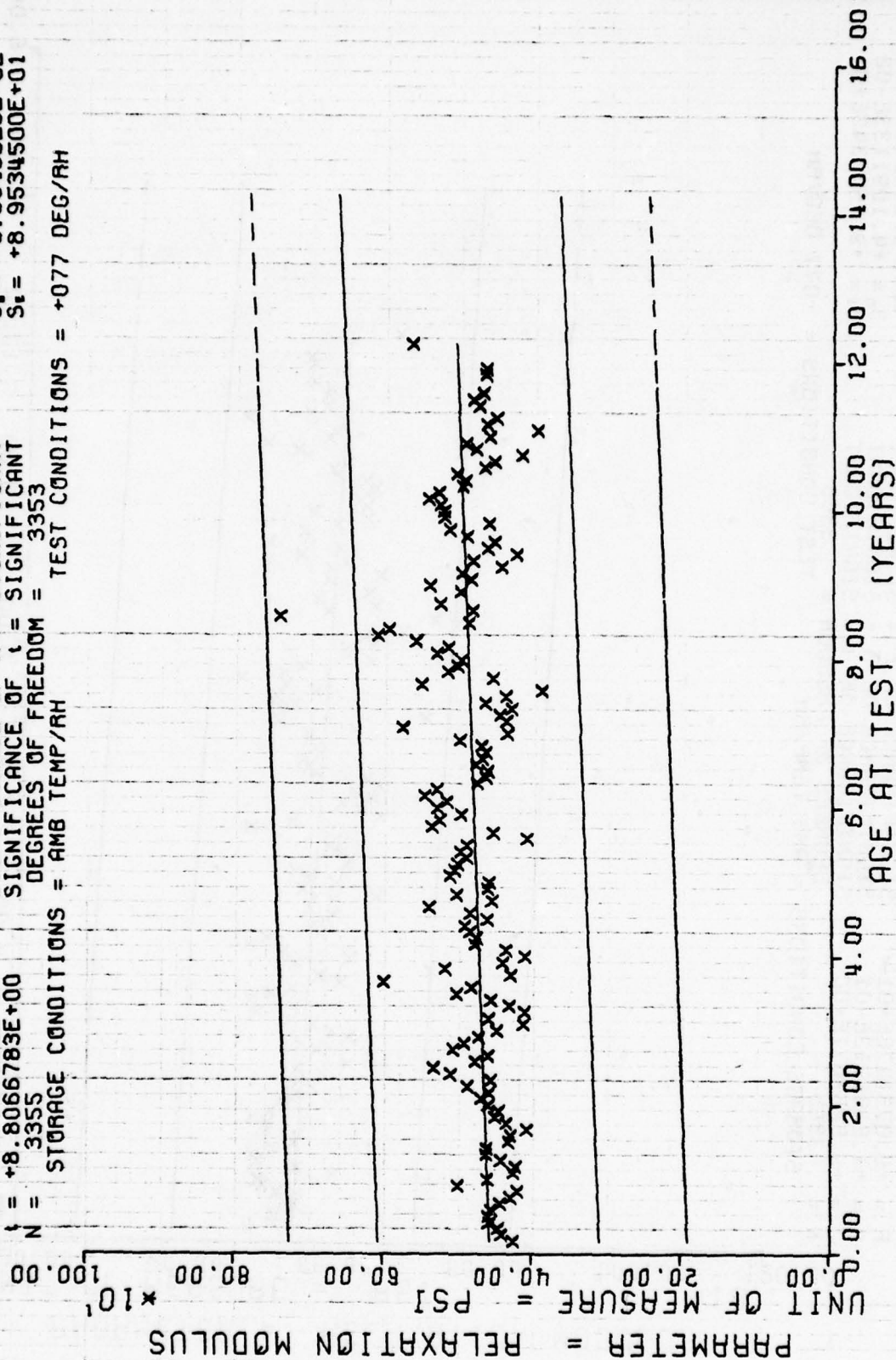
$Y = ((+5.7031073E+02) + (+3.9997844E-01) \times X)$   
 $F = +9.0731476E+01$  SIGNIFICANCE OF F = SIGNIFICANT  
 $R = +1.6231712E-01$  SIGNIFICANCE OF R = SIGNIFICANT  
 $t = +9.5253071E+00$  SIGNIFICANCE OF t = SIGNIFICANT  
 $N = 3355$  DEGREES OF FREEDOM = 3353  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +077 DEG/RH



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 10 SEC, 77 DEG F, TPH-1011

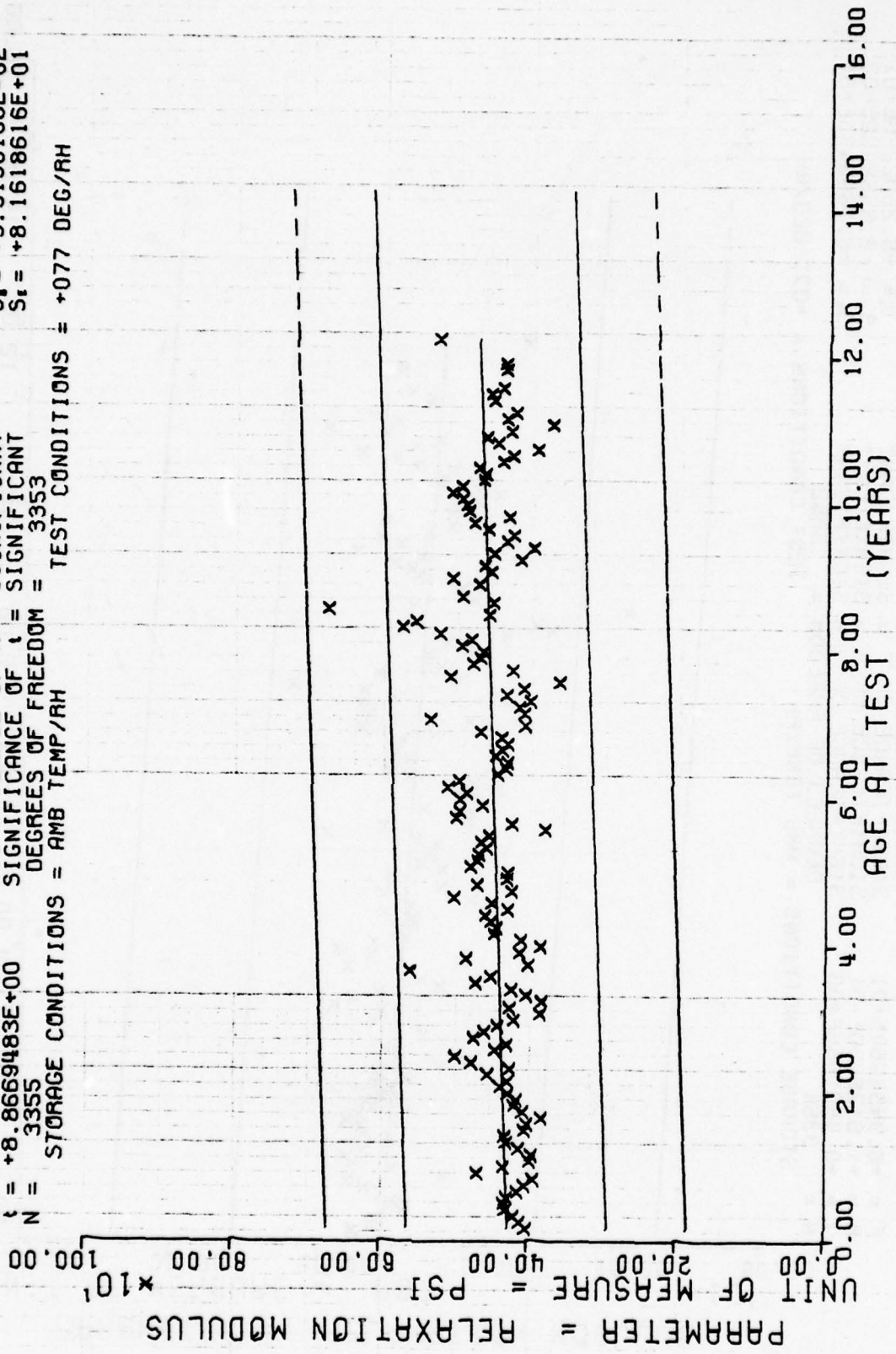
Figure 38

$Y = (( +4.5755940E+02 ) + ( +3.3944308E-01 ) * X)$   
 $F = +7.7557584E+01$  SIGNIFICANCE OF F = SIGNIFICANT  $G_1 = +9.0550581E+01$   
 $R = +1.5035912E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_1 = +3.8543826E-02$   
 $t = +8.8066783E+00$  SIGNIFICANCE OF t = SIGNIFICANT  $S_t = +8.9534500E+01$   
 $N = 3355$  DEGREES OF FREEDOM = 3353  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +077 DEG/RH



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 50 SEC, 77 DEG F, TPH-1011

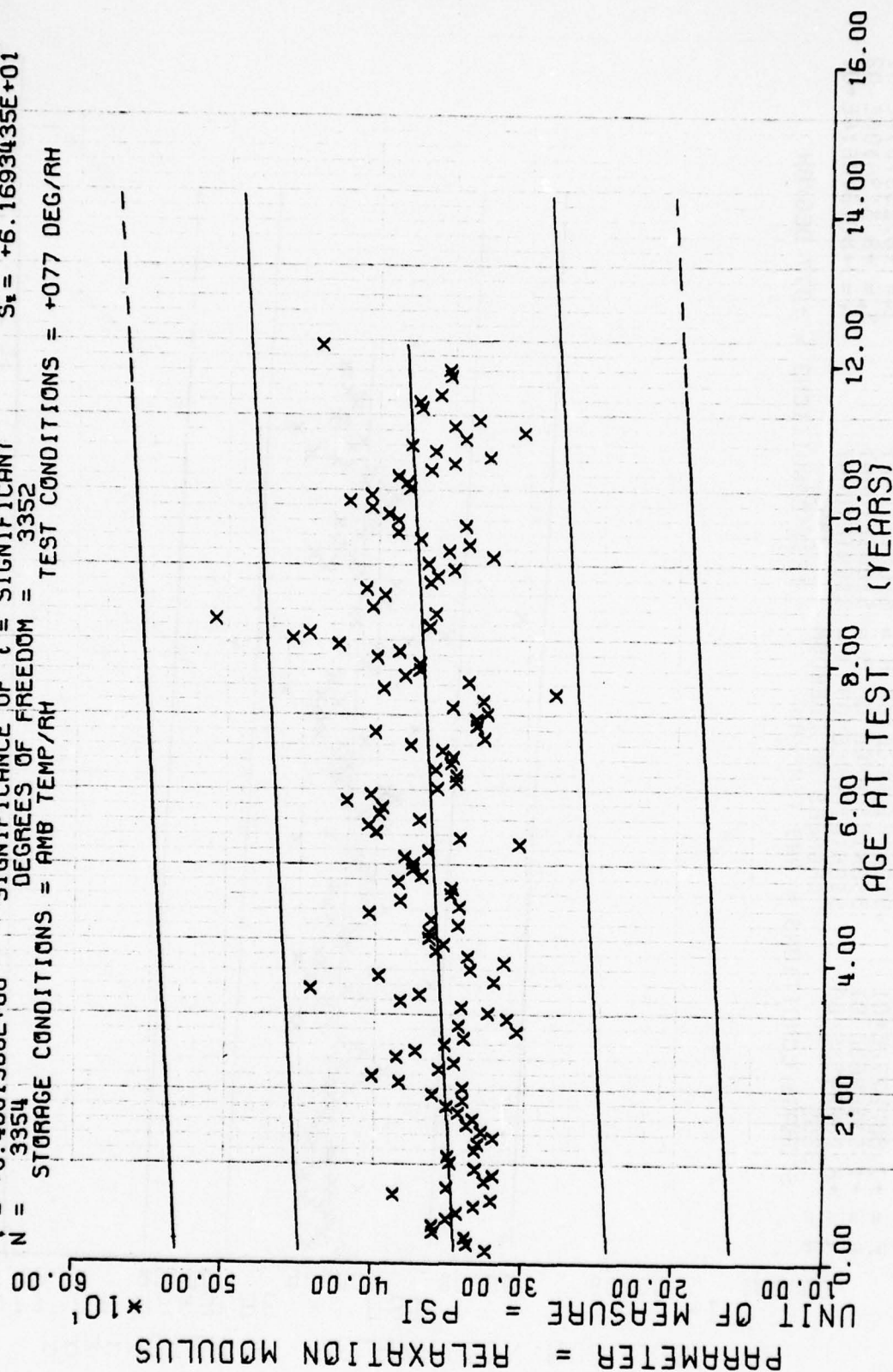
$Y = ((+4.2816926E+02) + (+3.1155004E-01) * X)$   
 $F = +7.8622772E+01$  SIGNIFICANCE OF F = SIGNIFICANT  $\sigma_r = +8.2557678E+01$   
 $R = +1.5136463E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_e = +3.5136106E-02$   
 $t = +8.8669483E+00$  SIGNIFICANCE OF t = SIGNIFICANT  $S_t = +8.1618616E+01$   
 $N = 3355$  DEGREES OF FREEDOM = 3353  
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = +077 DEG/AH



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 100 SEC, 77 DEG F, TPH-1011



$\gamma = ((+3.4534678E+02) + (+2.5125213E-01) * X)$   
 $F = +8.9494564E+01$  SIGNIFICANCE OF F = SIGNIFICANT  
 $R = +1.6125930E-01$  SIGNIFICANCE OF R = SIGNIFICANT  
 $t = +9.4601566E+00$  SIGNIFICANCE OF t = SIGNIFICANT  
 $N = 3354$  DEGREES OF FREEDOM = 3352  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +077 DEG/RH



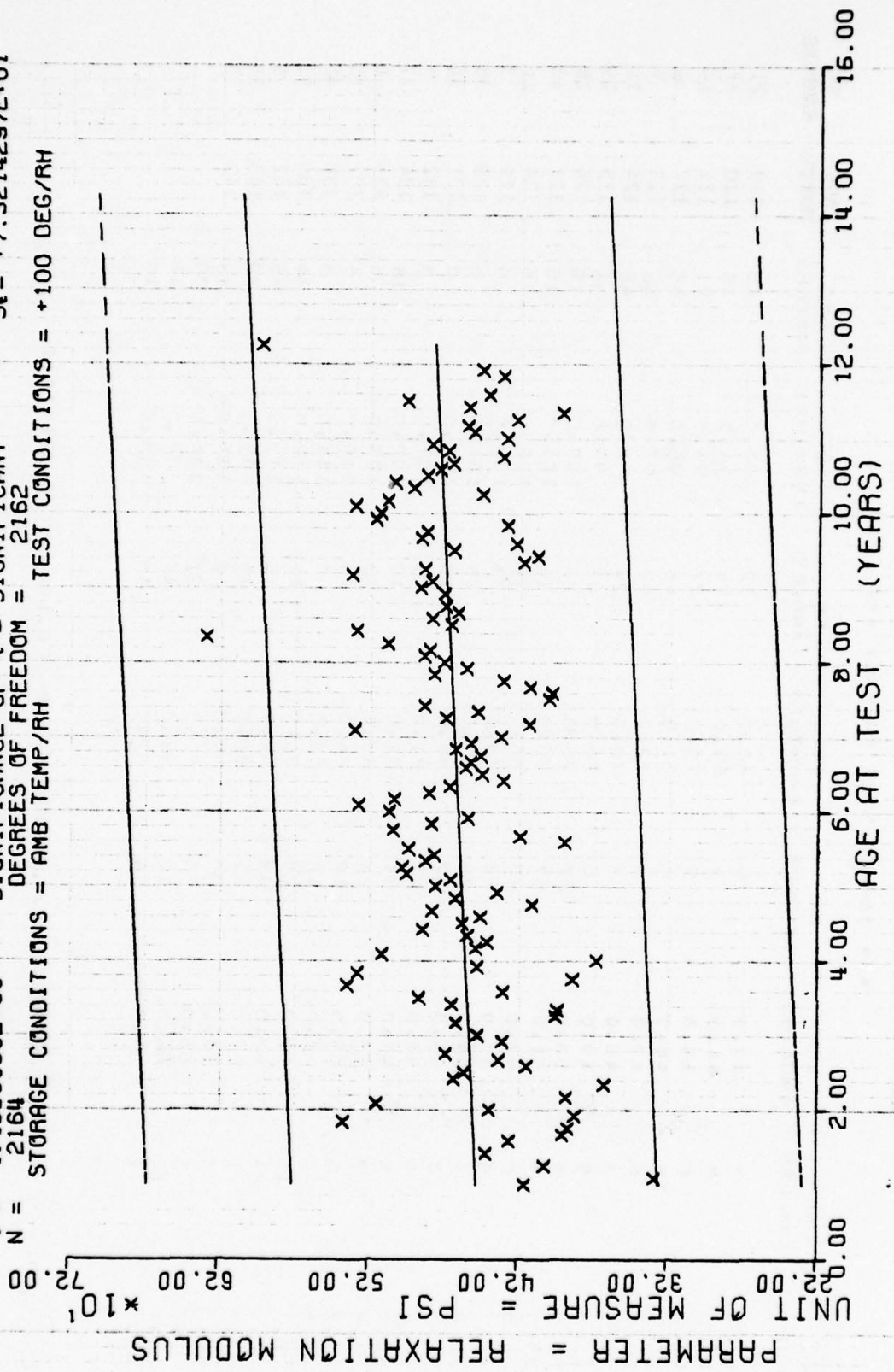
WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 1000 SEC, 77 DEG F, TPH-1011

[illegible]

RUNNING 5, STRESS RELAXATION MODULUS, 3.0% STRAIN, 10 SEC, 100 DEG F, TPEH-1011

This sample size summary is applicable to figures 42 thru 45.

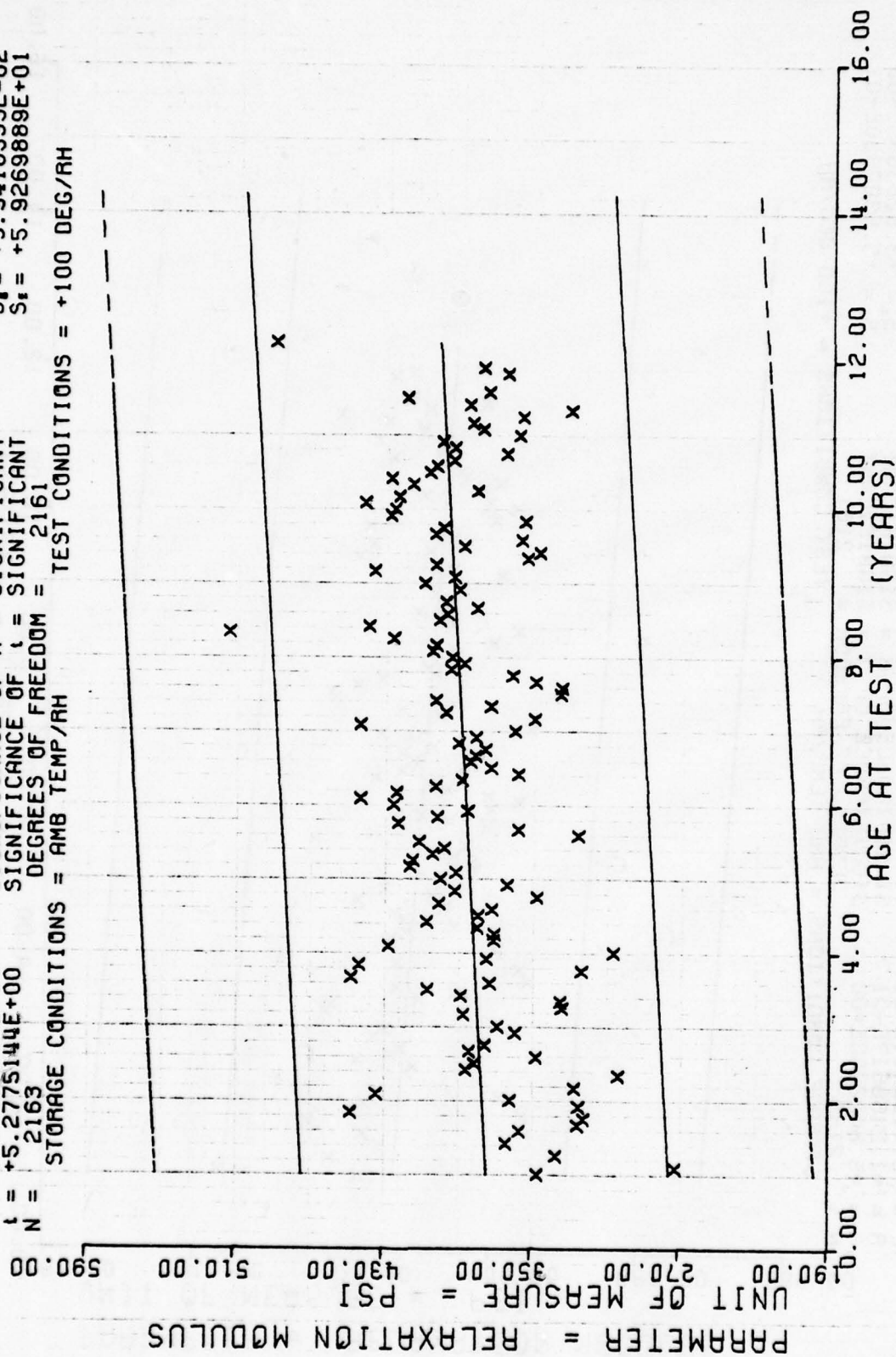
$F = +1.9923689E+01$  SIGNIFICANCE OF F = SIGNIFICANT  $\sigma = +7.3533869E+01$   
 $R = +9.5557571E-02$  SIGNIFICANCE OF R = SIGNIFICANT  $S_e = +4.8666741E-02$   
 $t = +4.4635960E+00$  SIGNIFICANCE OF t = SIGNIFICANT  $S_t = +7.3214297E+01$   
 $N = 2164$  DEGREES OF FREEDOM = 2162  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +100 DEG/RH



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 10 SEC, 100 DEG F, TPH-1011

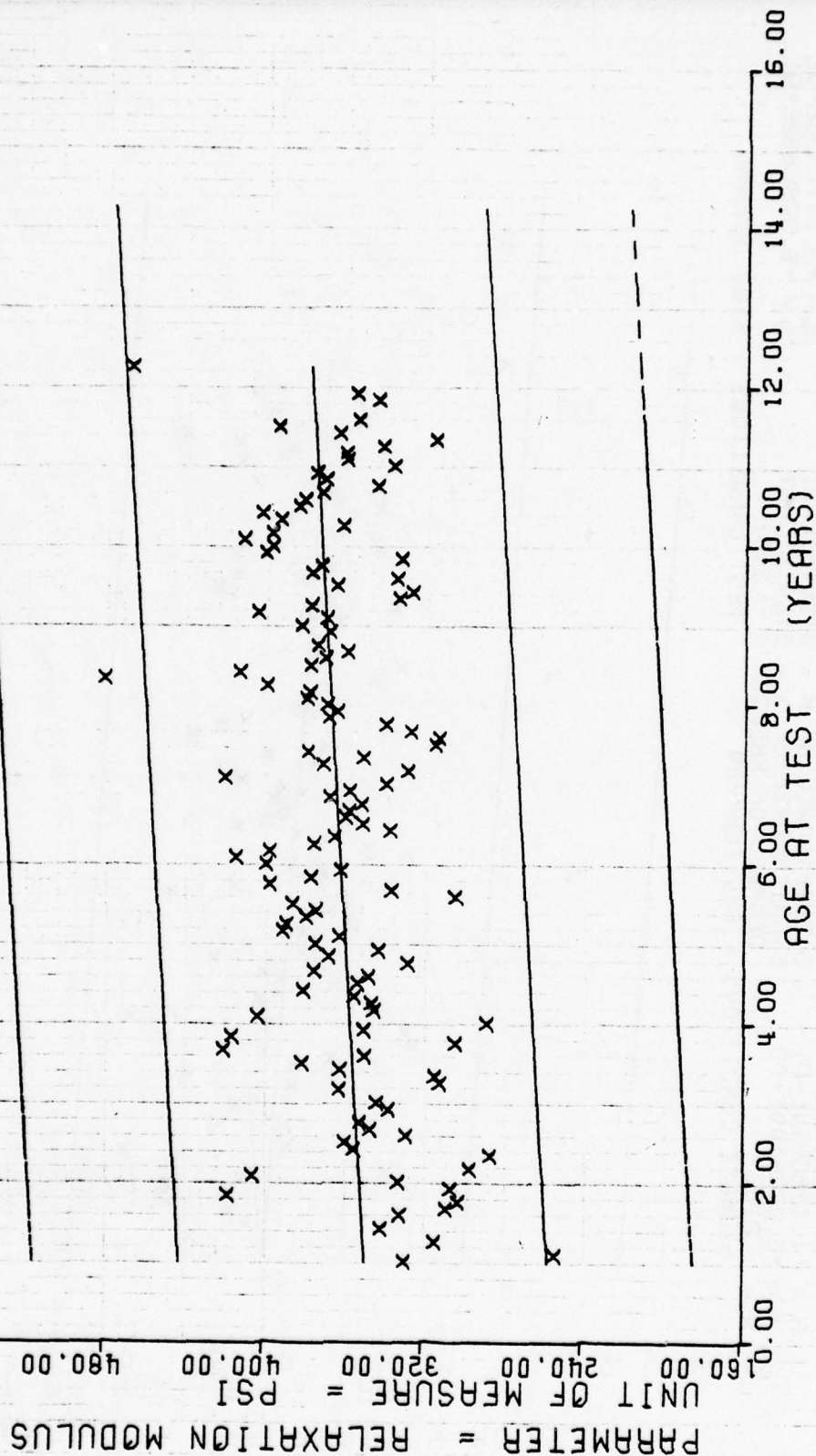


$Y = ((+3.7187248E+02) + (+2.0803189E-01) * X)$   
 $F = +2.7852159E+01$  SIGNIFICANCE OF F = SIGNIFICANT  $G = +5.9636820E+01$   
 $R = +1.1280314E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_0 = +3.9418535E-02$   
 $l = +5.2775144E+00$  SIGNIFICANCE OF l = SIGNIFICANT  $S_1 = +5.9269889E+01$   
 $N = 2163$  DEGREES OF FREEDOM = 2161  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +100 DEG/RH



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 50 SEC, 100 DEG F, TPH-1011

$Y = ((+3.4720259E+02) + (+2.1489910E-01) * X)$   
 $F = +3.4132411E+01$  SIGNIFICANCE OF F = SIGNIFICANT  
 $R = +1.2469617E-01$  SIGNIFICANCE OF R = SIGNIFICANT  
 $t = +5.8422950E+00$  SIGNIFICANCE OF t = SIGNIFICANT  
 $N = 2163$  DEGREES OF FREEDOM = 2161  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +100 DEG/RH



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 100 SEC, 100 DEG F, TPFH-1011

Figure 44





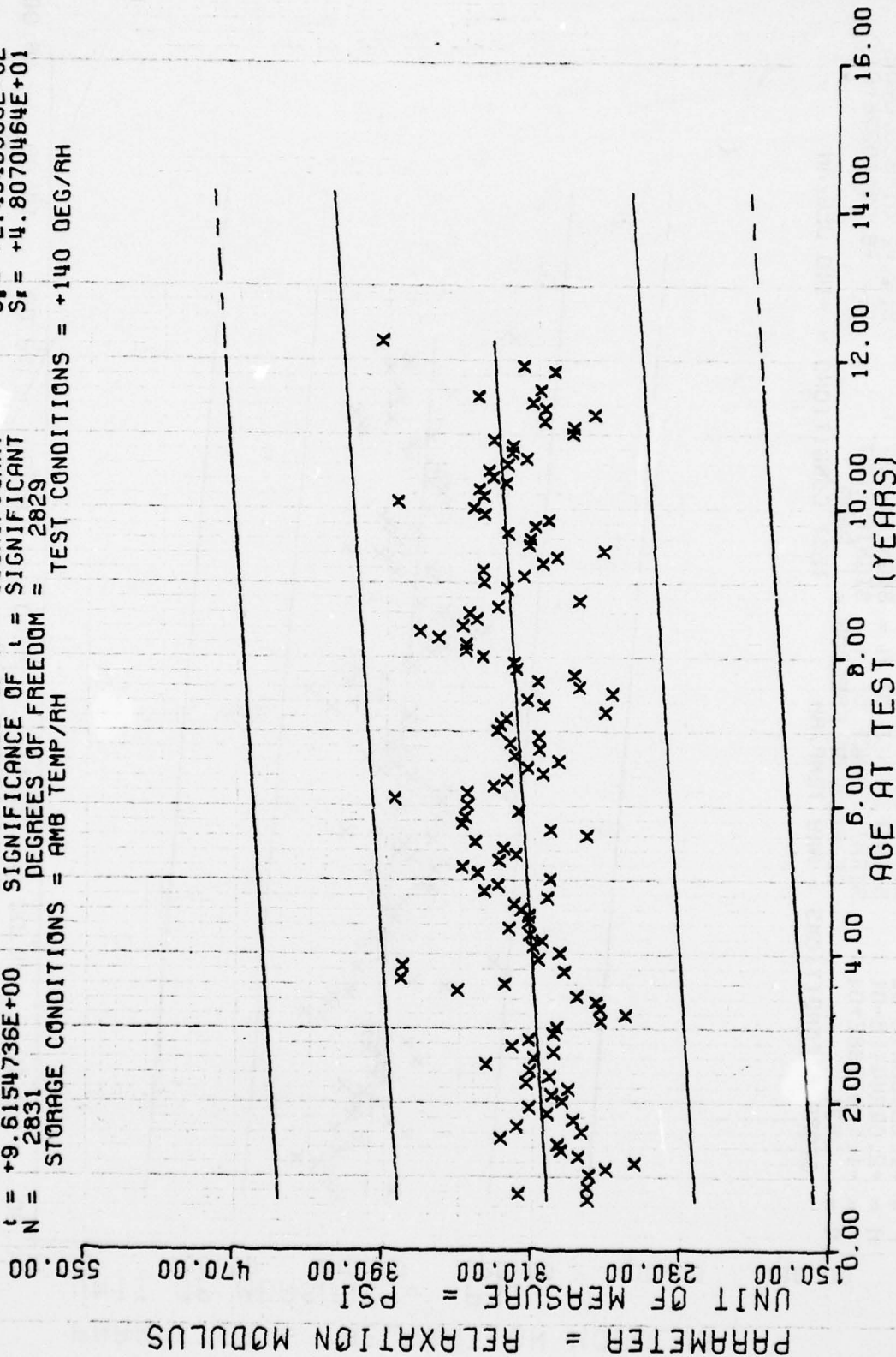
[illegible]

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RUNNING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 1000 SEC, 140 DEG F, TPH-1C11

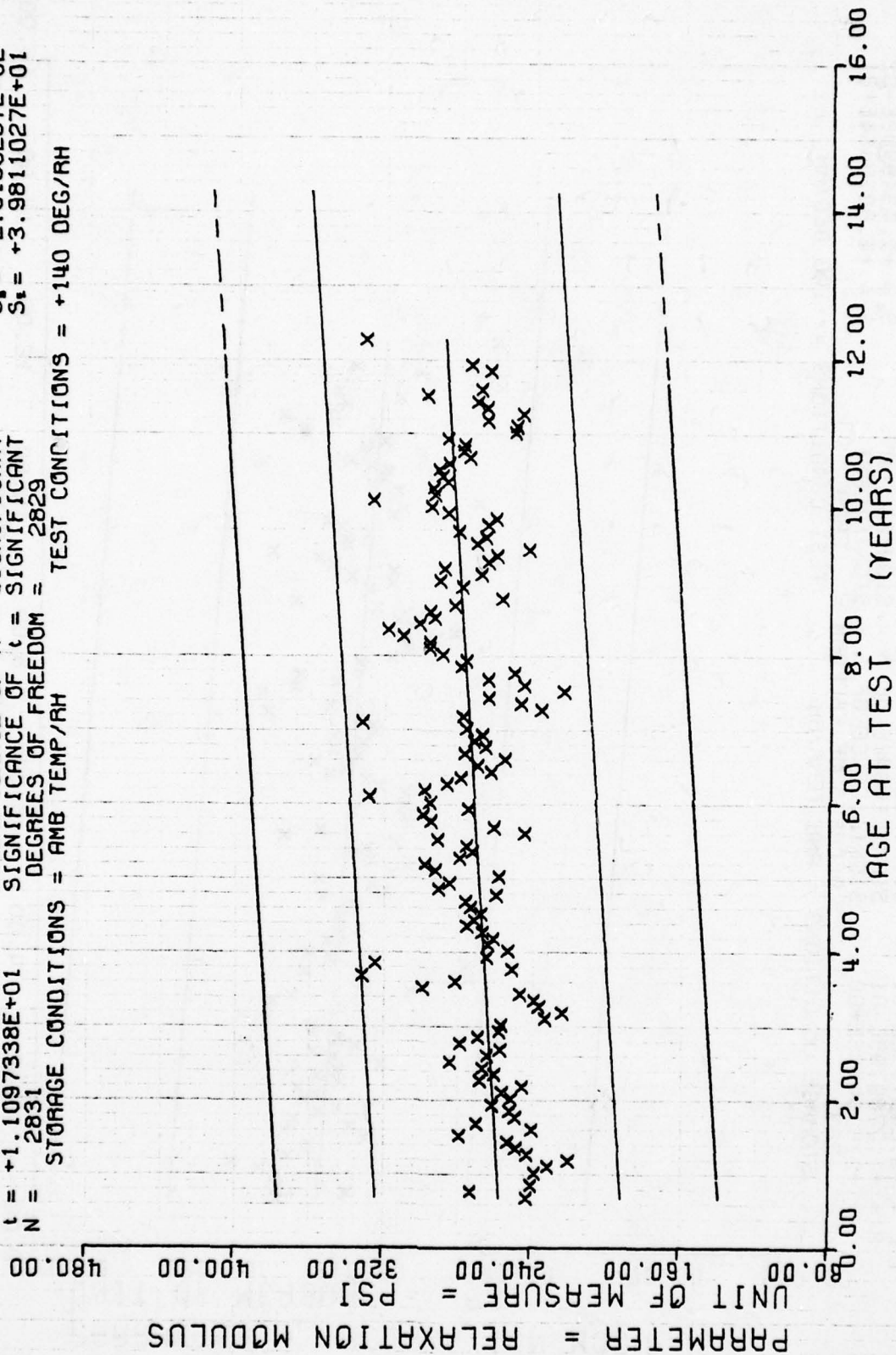
This sample size summary is applicable to figures 46 thru 49

$F = +9.2457332E+01$   
 $R = +1.7789793E-01$   
 $t = +9.6154736E+00$   
 $N = 2831$   
 $Y = ((+2.9996746E+02) + (+2.3412621E-01) \times X)$   
 SIGNIFICANCE OF F = SIGNIFICANT  
 SIGNIFICANCE OF R = SIGNIFICANT  
 SIGNIFICANCE OF t = SIGNIFICANT  
 DEGREES OF FREEDOM = 2829  
 STORAGE CONDITIONS = AMB TEMP/RH  
 TEST CONDITIONS = +140 DEG/RH



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 10 SEC, 140 DEG F, TPH-1011

$F = +1.2315091E+02$   
 $R = +2.0424411E-01$   
 $t = +1.1097338E+01$   
 $N = 2831$   
 $Y = ((+2.5576379E+02) + (+2.2378101E-01) * X)$   
 SIGNIFICANCE OF F = SIGNIFICANT  
 SIGNIFICANCE OF R = SIGNIFICANT  
 SIGNIFICANCE OF t = SIGNIFICANT  
 DEGREES OF FREEDOM = 2829  
 STORAGE CONDITIONS = AMB TEMP/RH  
 TEST CONDITIONS = +140 DEG/RH



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 50 SEC, 140 DEG F, TPFH-1011



$Y = (( +2.3999026E+02 ) + ( +2.1330409E-01 ) * X)$   
 $F = +1.3001793E+02$  SIGNIFICANCE OF F = SIGNIFICANT  $G_1 = +3.7763923E+01$   
 $R = +2.0961764E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_1 = +1.8706716E-02$   
 $t = +1.1402540E+01$  SIGNIFICANCE OF t = SIGNIFICANT  $S_2 = +3.6931464E+01$   
 $N = 2831$  DEGREES OF FREEDOM = 2829  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +140 DEG/RH

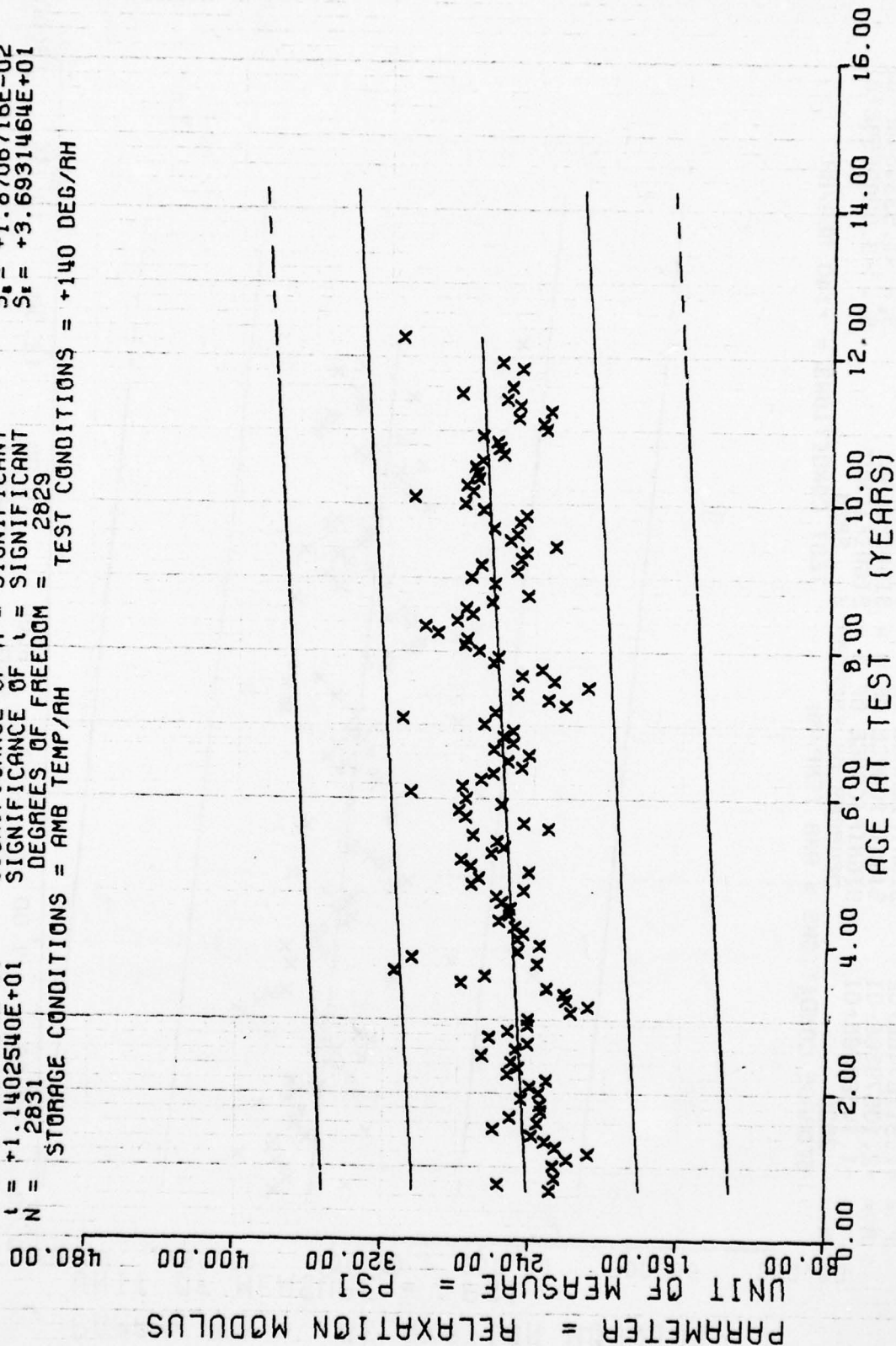
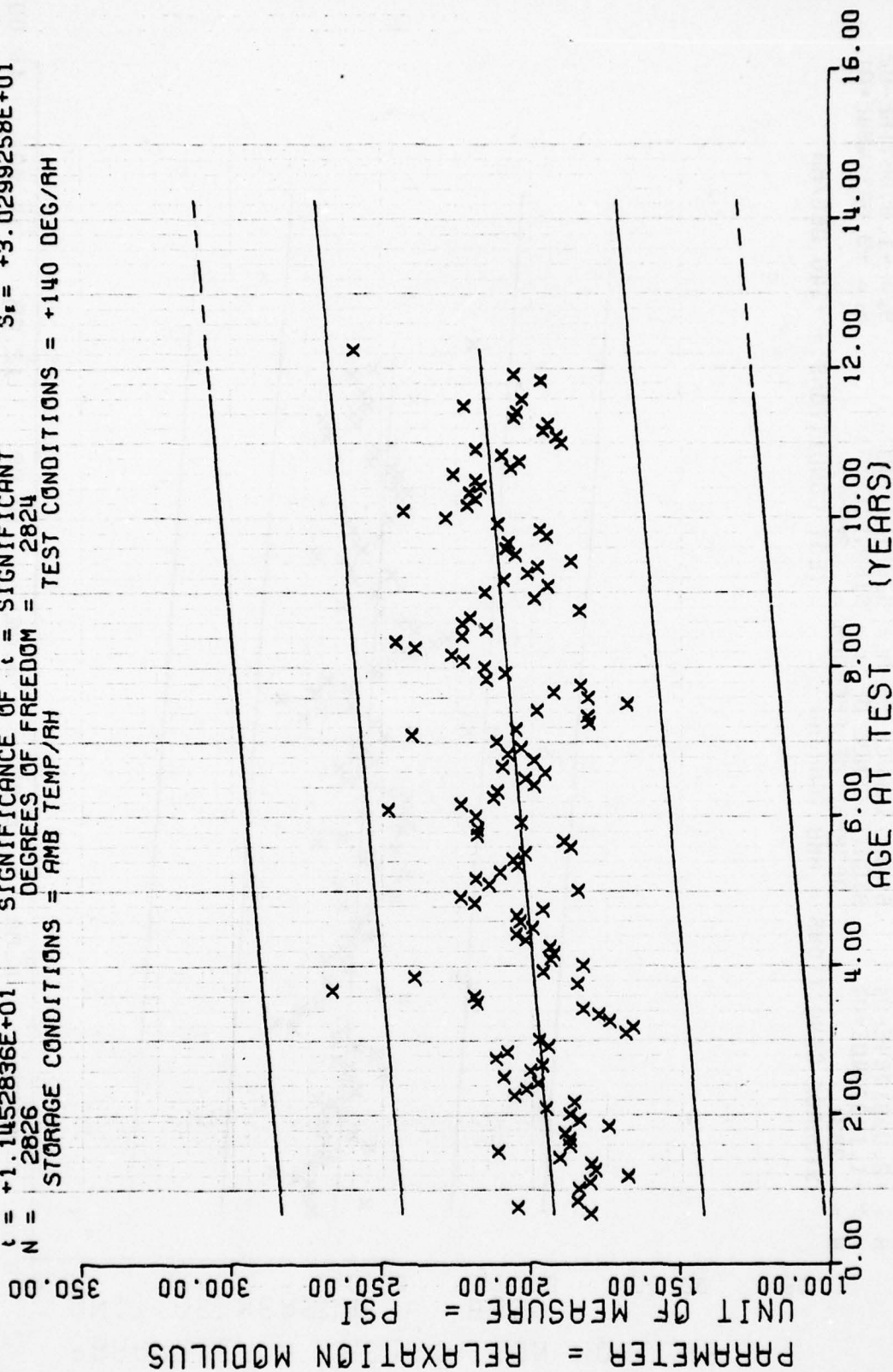


Figure 48

$Y = ((+1.9119137E+02) + ((+1.7585422E-01) * X)$   
 $F = +1.3116746E+02$  SIGNIFICANCE OF F = SIGNIFICANT  $G_1 = +3.0989447E+01$   
 $R = +2.1067936E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_0 = +1.5354644E-02$   
 $t = +1.1452836E+01$  SIGNIFICANCE OF t = SIGNIFICANT  $S_1 = +3.0299258E+01$   
 $N = 2826$  DEGREES OF FREEDOM = 2824  
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = +140 DEG/AH



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 1000 SEC, 140 DEG F, TPH-1011

\*\*\* SAMPLE SIZE SUMMARY \*\*\*

AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES
8.C	3	34.C	51	59.C	5	84.C	9	110	6	135	6	135	6
9.0	9	35.0	27	60.C	15	85.C	3	111	3	136	3	136	3
10.C	6	36.0	51	61.0	24	86.C	15	112	24	137	15	137	15
12.C	24	37.C	18	62.C	46	87.C	15	113	48	138	48	138	54
13.C	24	38.C	12	63.C	21	88.C	27	114	36	139	36	139	44
14.C	12	39.0	27	64.0	30	89.C	21	115	12	142	12	142	8
15.C	24	40.C	18	65.0	12	90.0	30	116	33	143	33	143	27
16.C	18	41.C	18	66.C	12	91.0	15	117	18	147	18	147	3
17.C	33	42.0	12	67.C	6	92.C	15	118	14		14		
18.C	18	43.C	9	68.0	12	93.C	15	119	15		15		
19.C	9	44.0	3	69.C	16	94.C	17	120	23		23		
20.C	6	45.0	6	70.0	20	95.C	18	121	9		9		
21.C	18	46.C	3	71.0	30	96.C	51	123	6		6		
22.C	9	47.C	15	72.0	48	97.C	48	124	9		9		
23.0	9	48.0	15	73.C	27	98.C	48	125	15		15		
24.C	30	49.C	15	74.0	36	99.C	36	126	15		15		
25.C	35	50.C	36	75.0	27	100.0	17	127	18		18		
26.0	24	51.0	57	76.C	35	101.0	12	128	12		12		
27.C	24	52.0	68	77.0	27	102.C	6	129	15		15		
28.C	26	53.C	24	78.C	39	103.C	9	130	6		6		
29.C	50	54.0	33	79.C	15	104.0	3	131	24		24		
30.C	42	55.0	27	80.C	18	105.C	6	132	42		42		
31.C	33	56.0	24	81.0	27	107.0	6	133	12		12		
32.C	54	57.C	36	82.C	15	108.C	21	134	6		6		
33.C	30	58.0	24	83.0	15	109.C	6	122	15		15		

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WING 6, STRESS RELAXATION MODULUS, 3.C% STRAIN, 1000 SEC, 180 DEG F, TPT-1C11

This sample size summary is applicable to figures 50 thru 53



$F = +1.3775862E+02$   
 $R = +2.1472699E-01$   
 $t = +1.1737061E+01$   
 $N = 2852$   
 $Y = ((+2.4197625E+02) + (+2.1320390E-01) * X)$   
 SIGNIFICANCE OF F = SIGNIFICANT  
 SIGNIFICANCE OF R = SIGNIFICANT  
 SIGNIFICANCE OF t = SIGNIFICANT  
 DEGREES OF FREEDOM = 2850  
 STORAGE CONDITIONS = AMB TEMP/AH  
 TEST CONDITIONS = +180 DEG/AH

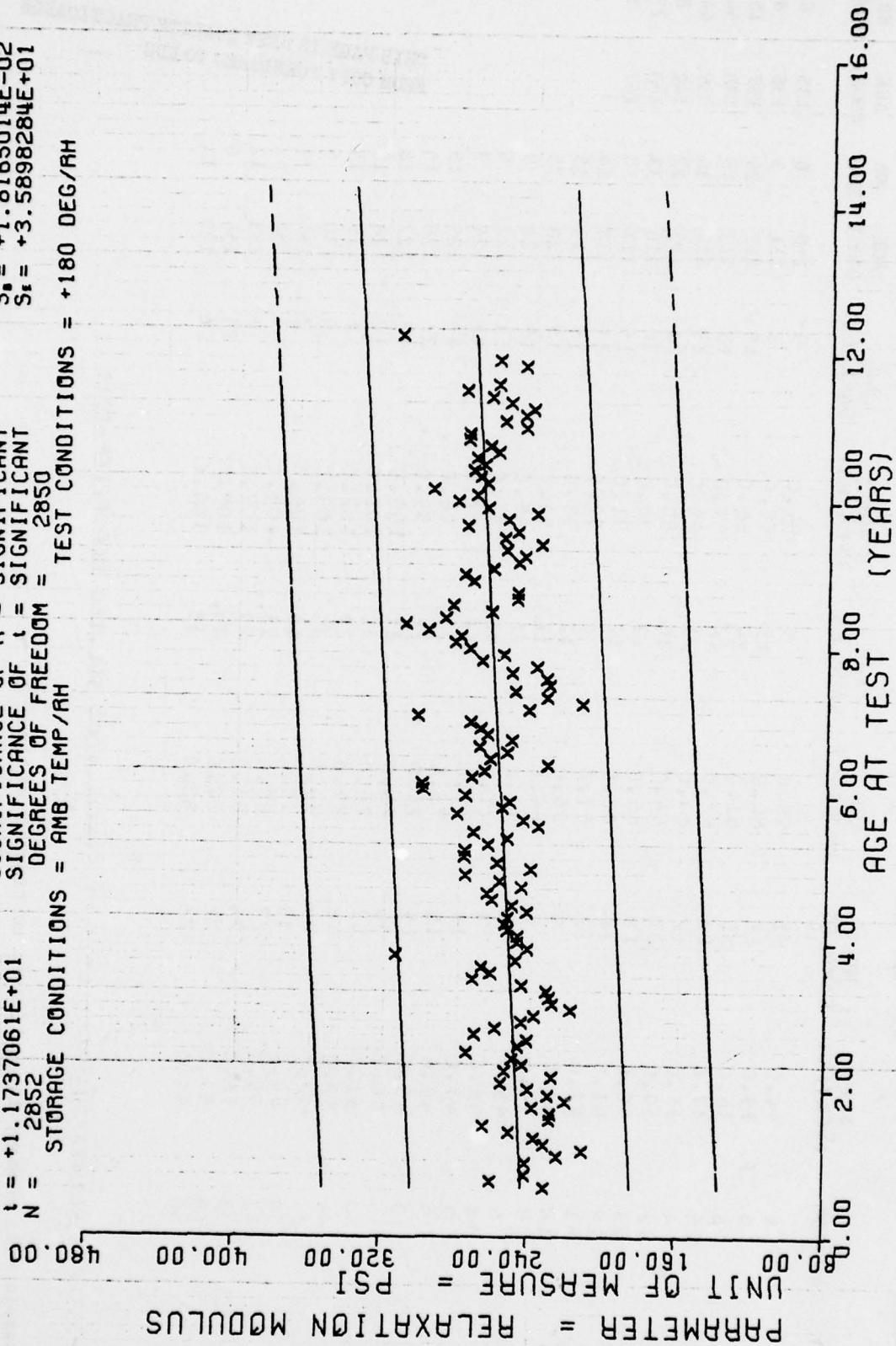
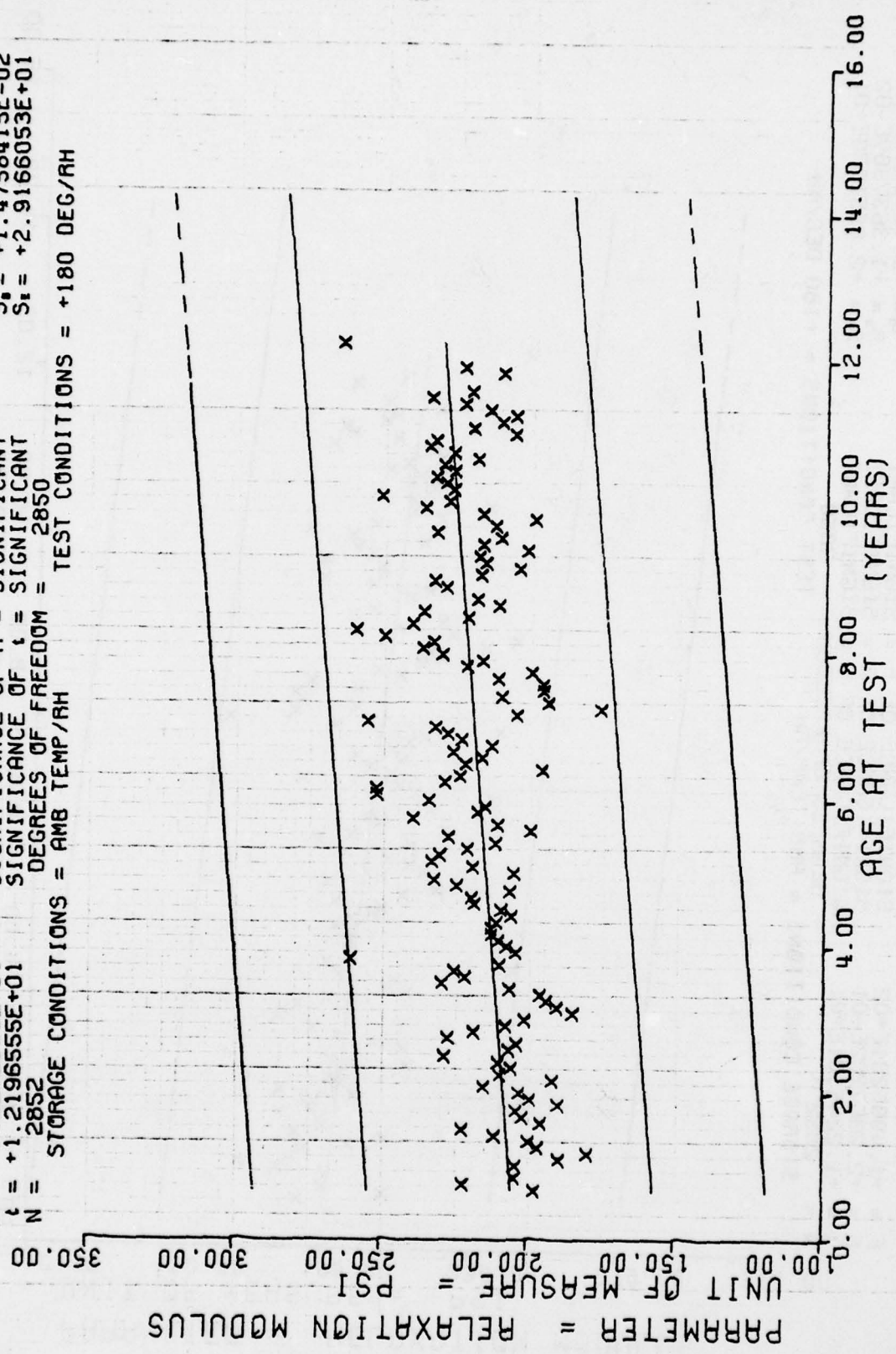


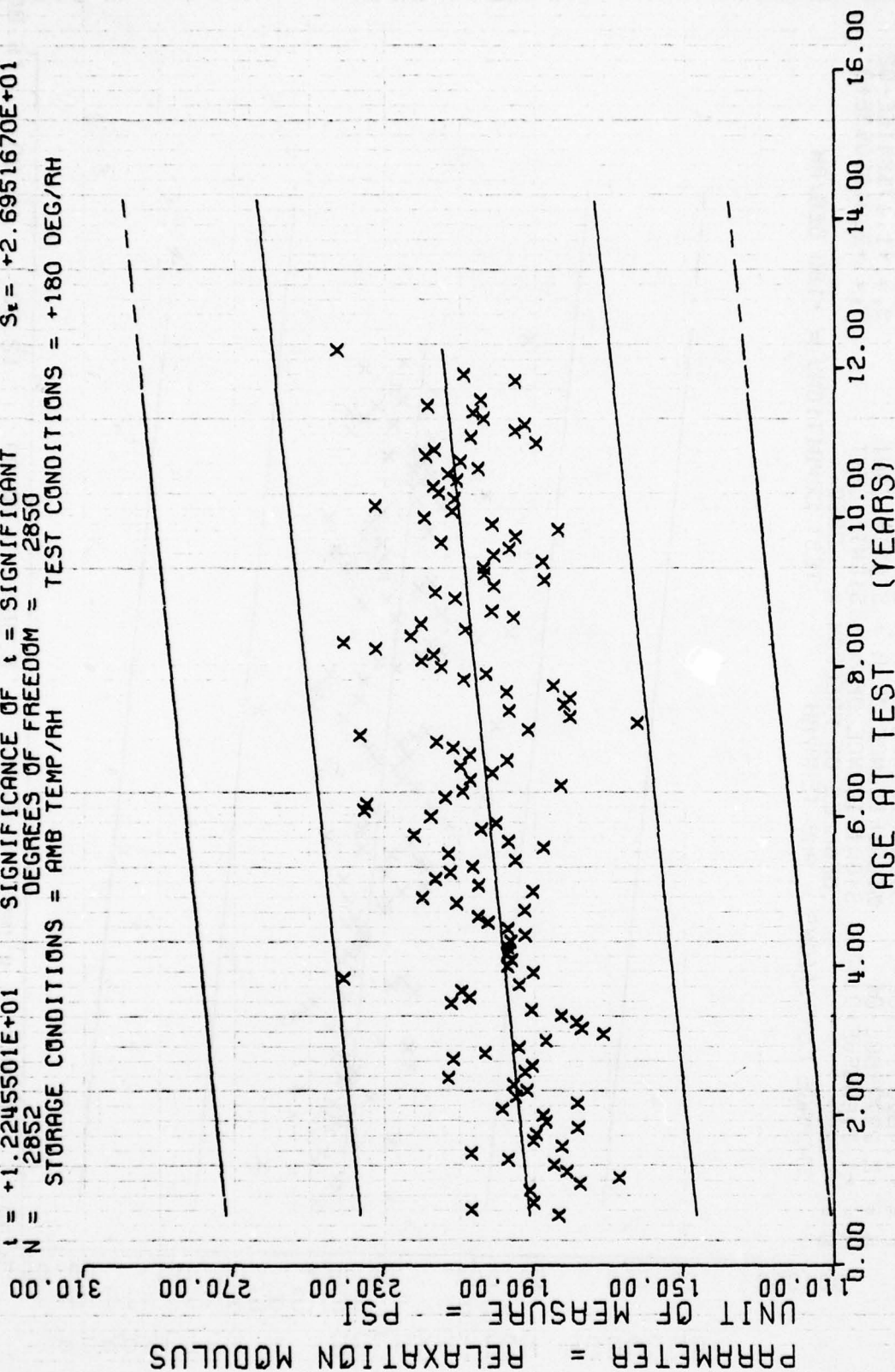
Figure 50

$Y = ((+2.0435185E+02) + (+1.8000183E-01) * X)$   
 $F = +1.4875597E+02$  SIGNIFICANCE OF F = SIGNIFICANT  
 $R = +2.2272380E-01$  SIGNIFICANCE OF R = SIGNIFICANT  
 $t = +1.2196555E+01$  SIGNIFICANCE OF t = SIGNIFICANT  
 $N = 2852$  DEGREES OF FREEDOM = 2850  
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = +180 DEG/AH



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 50 SEC, 180 DEG F, TPH-1011

$Y = ((+1.9000371E+02) + (+1.6700302E-01) * X)$   
 $F = +1.4995231E+02$  SIGNIFICANCE OF F = SIGNIFICANT  $G = +2.7646760E+01$   
 $R = +2.2357302E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_0 = +1.3637907E-02$   
 $t = +1.2245501E+01$  SIGNIFICANCE OF t = SIGNIFICANT  $S_t = +2.6951670E+01$   
 $N = 2852$  DEGREES OF FREEDOM = 2850  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = +180 DEG/RH

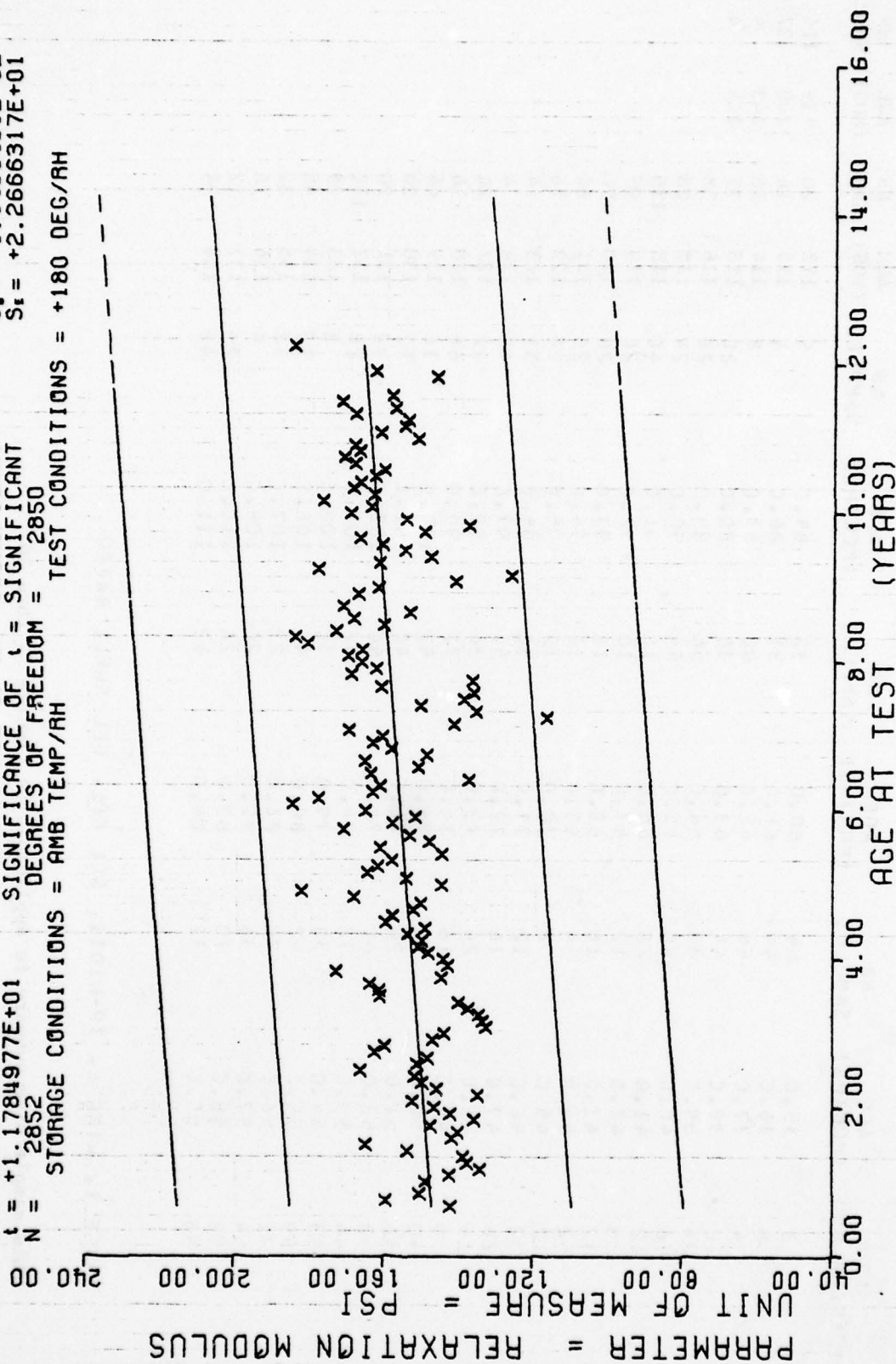


WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 100 SEC, 180 DEG F, TPH-101

Figure 52



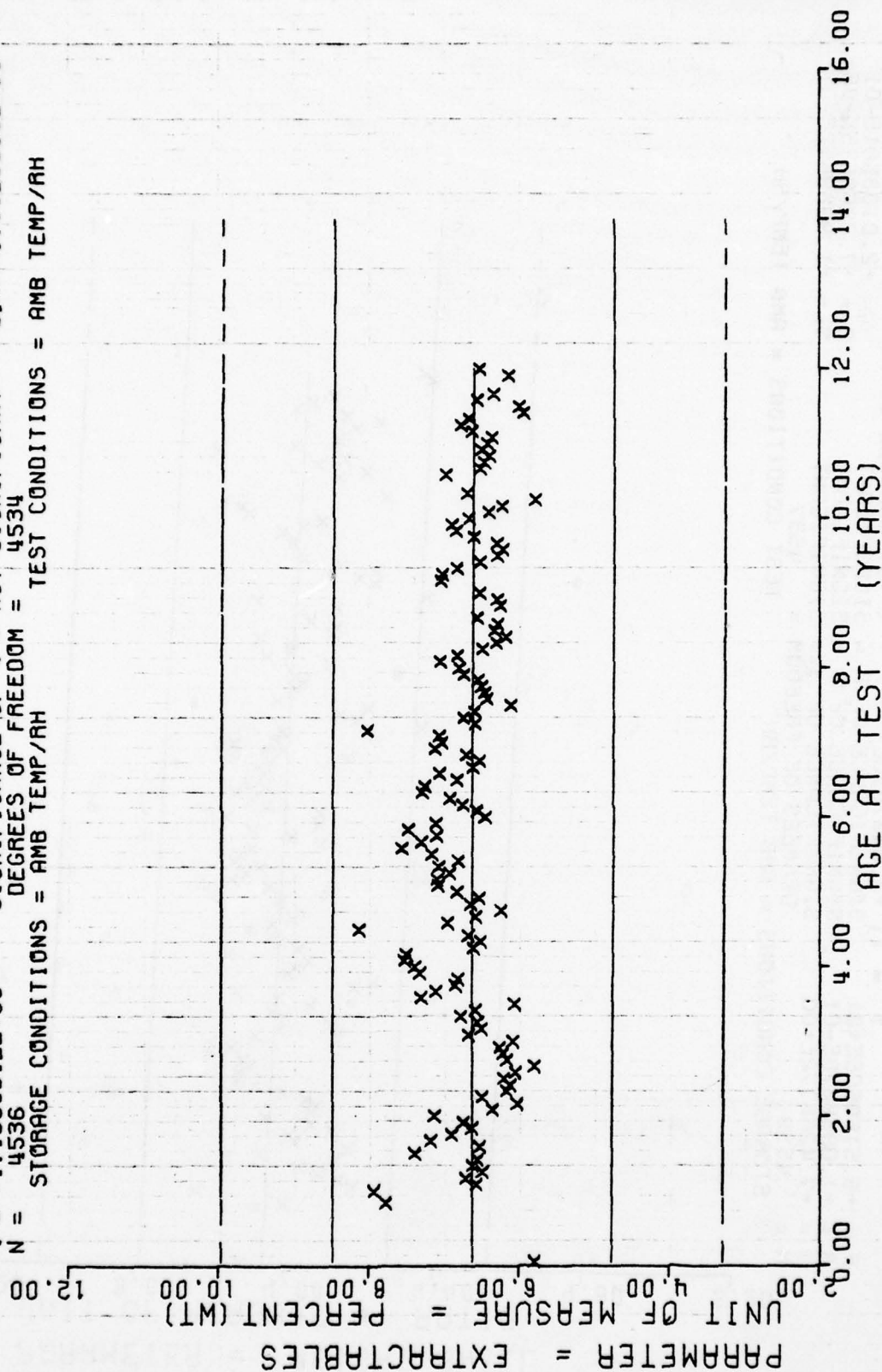
$F = +1.3888570E+02$   
 $R = +2.1556294E-01$   
 $t = +1.1784977E+01$   
 $N = 2852$   
 $Y = ((+1.4632884E+02) + (+1.3516734E-01) * X)$   
 SIGNIFICANCE OF F = SIGNIFICANT  
 SIGNIFICANCE OF R = SIGNIFICANT  
 SIGNIFICANCE OF t = SIGNIFICANT  
 DEGREES OF FREEDOM = 2850  
 STORAGE CONDITIONS = AMB TEMP/RH  
 TEST CONDITIONS = +180 DEG/RH



WING 6, STRESS RELAXATION MODULUS, 3.0% STRAIN, 1000 SEC, 180 DEG F, TPH-1011



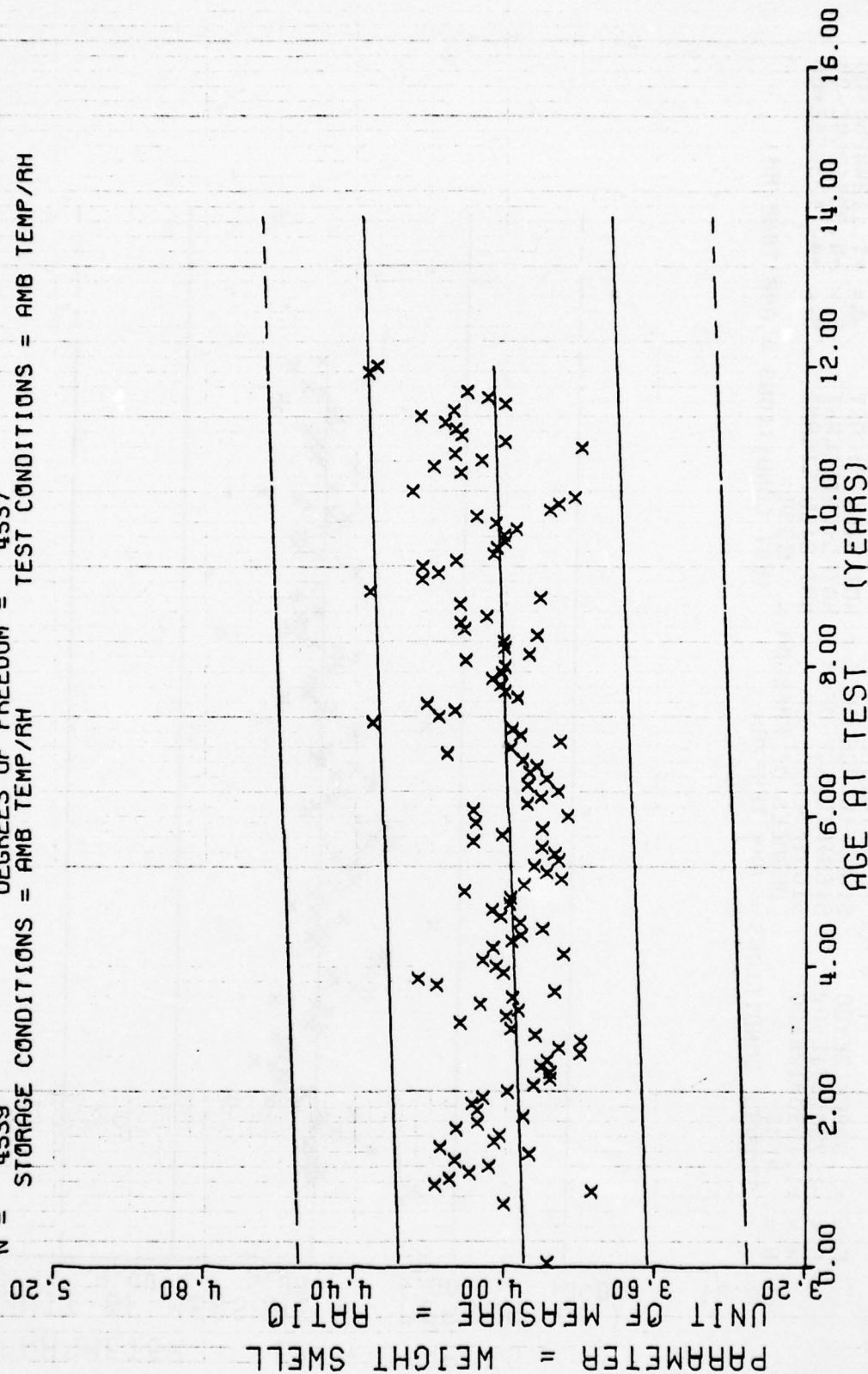
$Y = ((+6.6414452E+00) + (-5.1276212E-04) \times X)$   
 $F = +1.3996812E+00$  SIGNIFICANCE OF F = NOT SIGNIFICANT  $\sigma_1 = +1.1124425E+00$   
 $R = -1.7567371E-02$  SIGNIFICANCE OF R = NOT SIGNIFICANT  $S_0 = +4.3341244E-04$   
 $t = +1.1830812E+00$  SIGNIFICANCE OF t = NOT SIGNIFICANT  $S_e = +1.1123935E+00$   
 $N = 4536$  DEGREES OF FREEDOM = 4534  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



STAGE 1, WING 6 TP-H1011, SOL GEL, PERCENT EXTRACTABLES



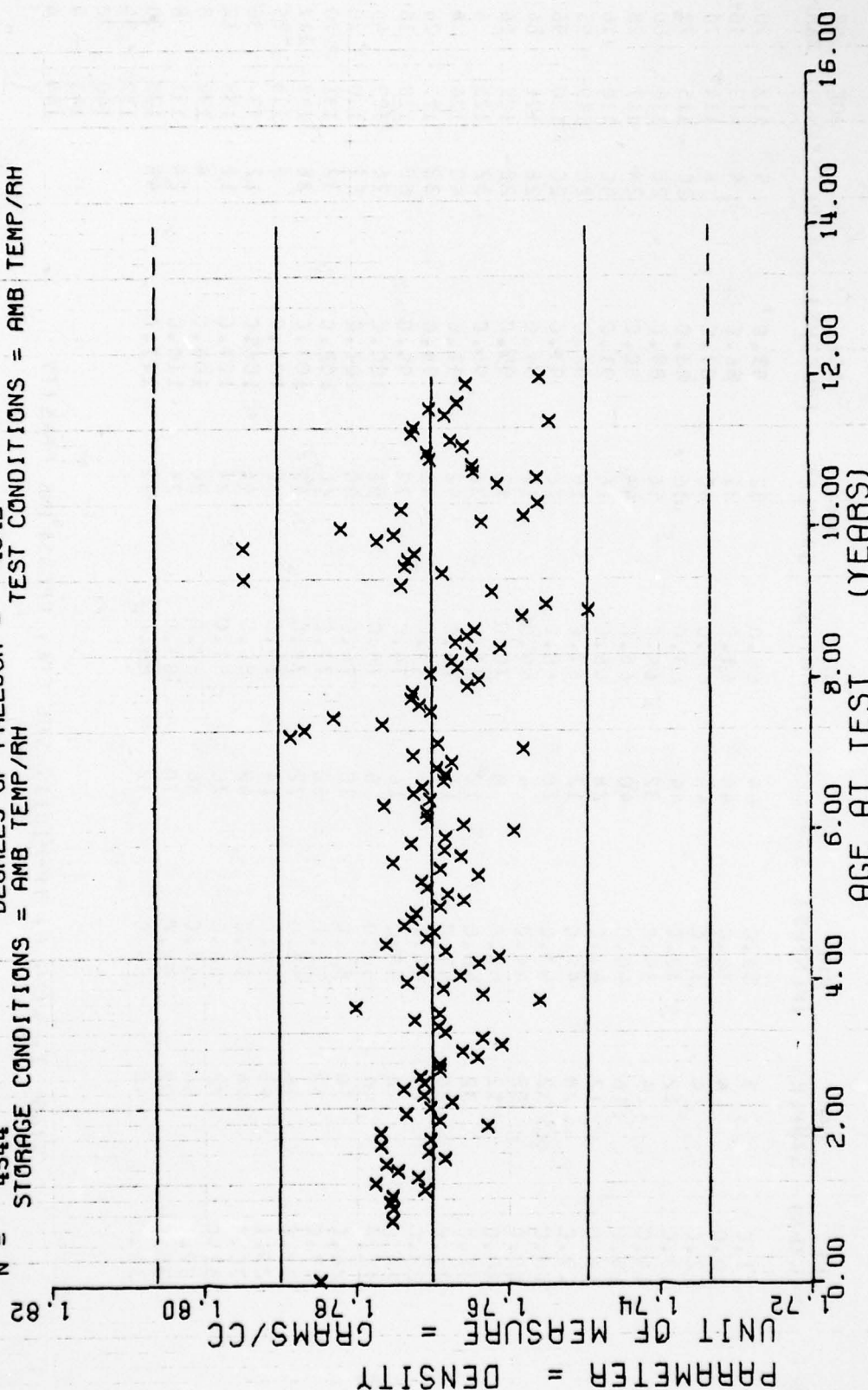
$Y = ((+3.9497930E+00) + (+5.7832852E-04) * X)$   
 $F = +5.5158506E+01$  SIGNIFICANCE OF F = SIGNIFICANT  $G_1 = +2.0108581E-01$   
 $R = +1.0959678E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_0 = +7.7869675E-05$   
 $t = +7.4268772E+00$  SIGNIFICANCE OF t = SIGNIFICANT  $S_1 = +1.9989652E-01$   
 $N = 4539$  DEGREES OF FREEDOM = 4537  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



STAGE 1, WING 6, TP-H1011, SOL GEL, GEL SWELL RATIO

Figure 55

$Y = ((+1.7699814E+00) + (-4.3488019E-06) * X)$   
 $F = +8.4803424E-01$  SIGNIFICANCE OF F = NOT SIGNIFICANT  $G_1 = +1.2125541E-02$   
 $R = -1.3662890E-02$  SIGNIFICANCE OF R = NOT SIGNIFICANT  $S_0 = +4.7224017E-06$   
 $t = +9.2088774E-01$  SIGNIFICANCE OF t = NOT SIGNIFICANT  $S_e = +1.2125744E-02$   
 $N = 4544$  DEGREES OF FREEDOM = 4542  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



STAGE 1, WING 6, TP-H1011, SOL GEL, DENSITY

AD-A057 428

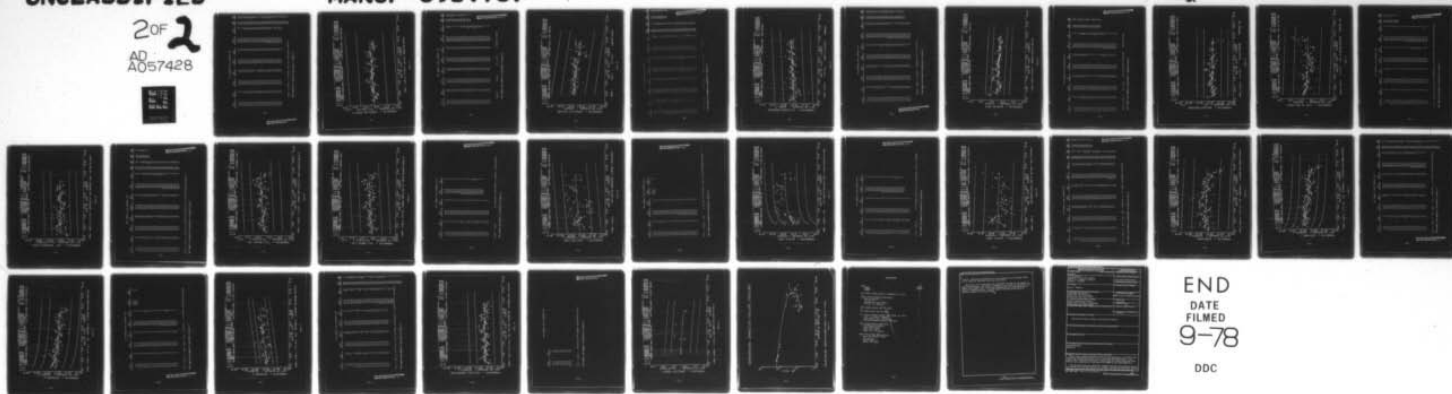
OGDEN AIR LOGISTICS CENTER HILL AFB UTAH PROPELLANT L--ETC F/G 21/9.2  
PROPELLANT SURVEILLANCE REPORT LGM-30 F AND G STAGE I. PHASE E,--ETC(U)  
JUN 78 J A THOMPSON  
MANCP-396(78)

UNCLASSIFIED

2 of 2  
AD-A057428



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9-78  
DDC



AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES
1.C	3	35.C	64	60.0	32	85.C	9	112	20		
10.C	4	36.C	44	61.0	32	86.C	4	113	16		
12.C	4	37.C	48	62.0	40	87.C	8	114	76		
13.C	12	38.C	44	63.0	36	88.C	20	115	72		
14.C	24	39.C	32	64.C	56	89.C	28	116	60		
15.C	16	40.C	40	65.C	44	90.C	24	117	28		
16.C	12	41.C	28	66.C	16	91.0	40	118	116		
17.C	28	42.0	12	67.C	16	92.0	20	119	95		
18.C	32	43.0	16	68.0	16	93.C	20	120	96		
19.C	52	44.C	4	69.0	12	94.0	28	121	64		
20.C	12	45.C	8	70.C	12	95.C	28	122	56		
21.C	32	46.0	12	71.0	36	96.C	32	123	4		
22.C	28	47.0	16	72.0	52	97.C	40	124	4		
23.C	24	48.C	24	73.C	36	98.0	32	127	24		
24.0	8	49.0	16	74.C	72	99.C	68	128	16		
25.C	40	50.0	8	75.0	52	100.C	76	129	44		
26.C	56	51.C	20	76.0	40	101.0	52	130	20		
27.0	32	52.0	60	77.C	40	102.C	32	131	70		
28.C	44	53.0	72	78.0	42	103.C	28	132	112		
29.C	43	54.0	14	79.0	38	104.0	8	133	75		
30.C	44	55.C	42	80.C	46	106.C	12	134	36		
31.0	72	56.0	70	81.0	24	107.C	12	135	12		
32.C	64	57.0	36	82.0	20	108.C	4	136	8		
33.C	52	58.C	70	83.0	24	110.0	24	137	8		
34.0	48	59.0	32	84.C	12	111.C	48	138	30		

STAGE 1. KING 6, IP-P1011. SOL GEL, CROSSLINK DENSITY

STAGE 1, KING 6, TP-H1011, SCL GEL, CRCSSLINK DENSITY

This sample size summary is applicable to figure 57

$Y = ((+1.0560424E-02) + (+8.0927375E-06) * X)$   
 $F = +2.8505635E+01$  SIGNIFICANCE OF F = SIGNIFICANT  
 $R = +8.0184741E-02$  SIGNIFICANCE OF R = SIGNIFICANT  
 $t = +5.3390669E+00$  SIGNIFICANCE OF t = SIGNIFICANT  
 $N = 4407$  DEGREES OF FREEDOM = 4405  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH

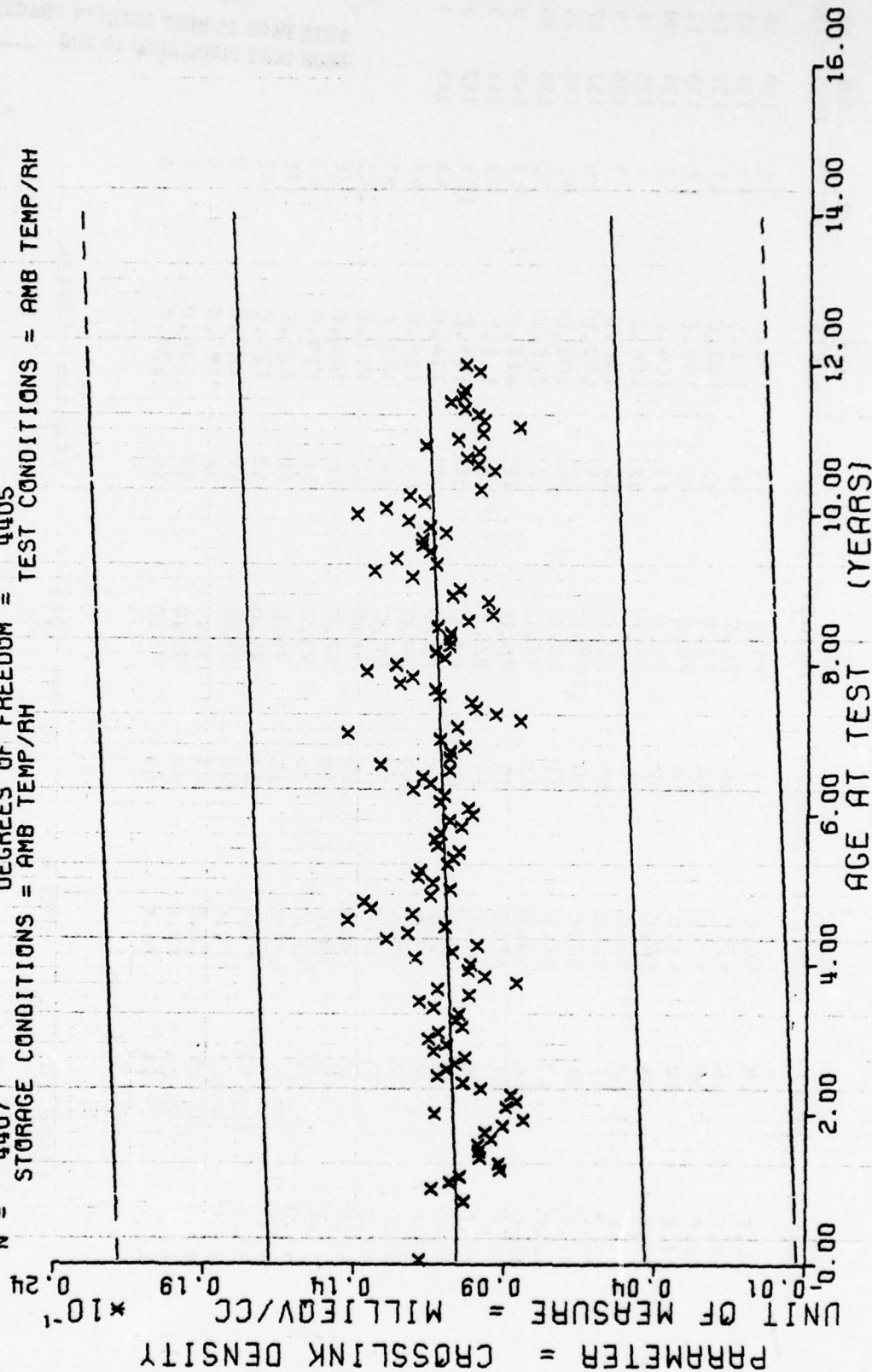


Figure 57

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### CONSTANT STRAIN

TP-1 1011

WING 6

## STAGE 1

This sample size summary is applicable to figure 58



$Y = ((+2.6480863E+01) + (-2.3701098E-02) * X)$   
 $F = +3.5061230E+02$  SIGNIFICANCE OF F = SIGNIFICANT  
 $R = -2.8480029E-01$  SIGNIFICANCE OF R = SIGNIFICANT  
 $t = +1.8724644E+01$  SIGNIFICANCE OF t = SIGNIFICANT  
 $N = 3974$  DEGREES OF FREEDOM = 3972  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH

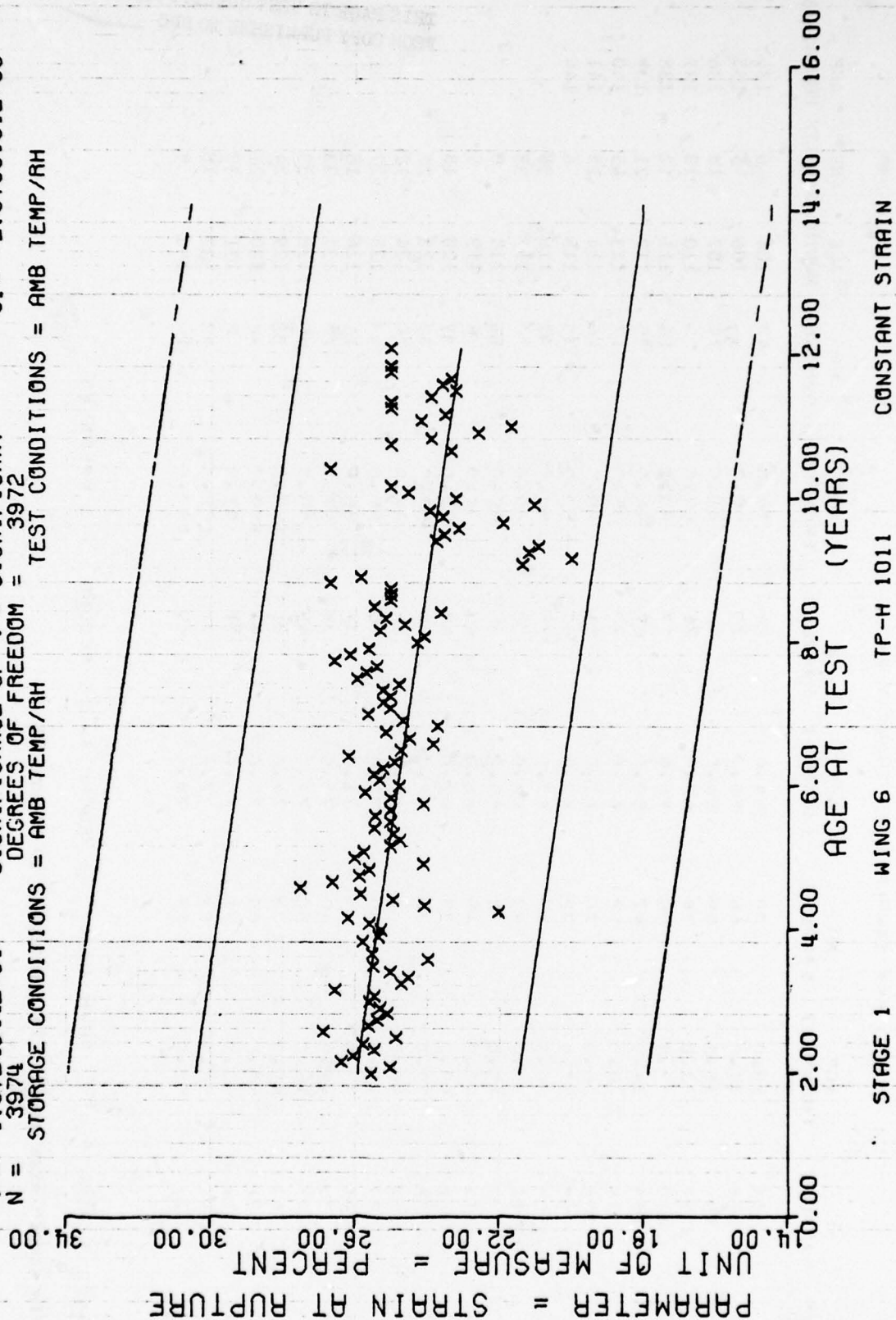


Figure 58

## \*\*\* A SAMPLE SIZE SUMMARY \*\*\*

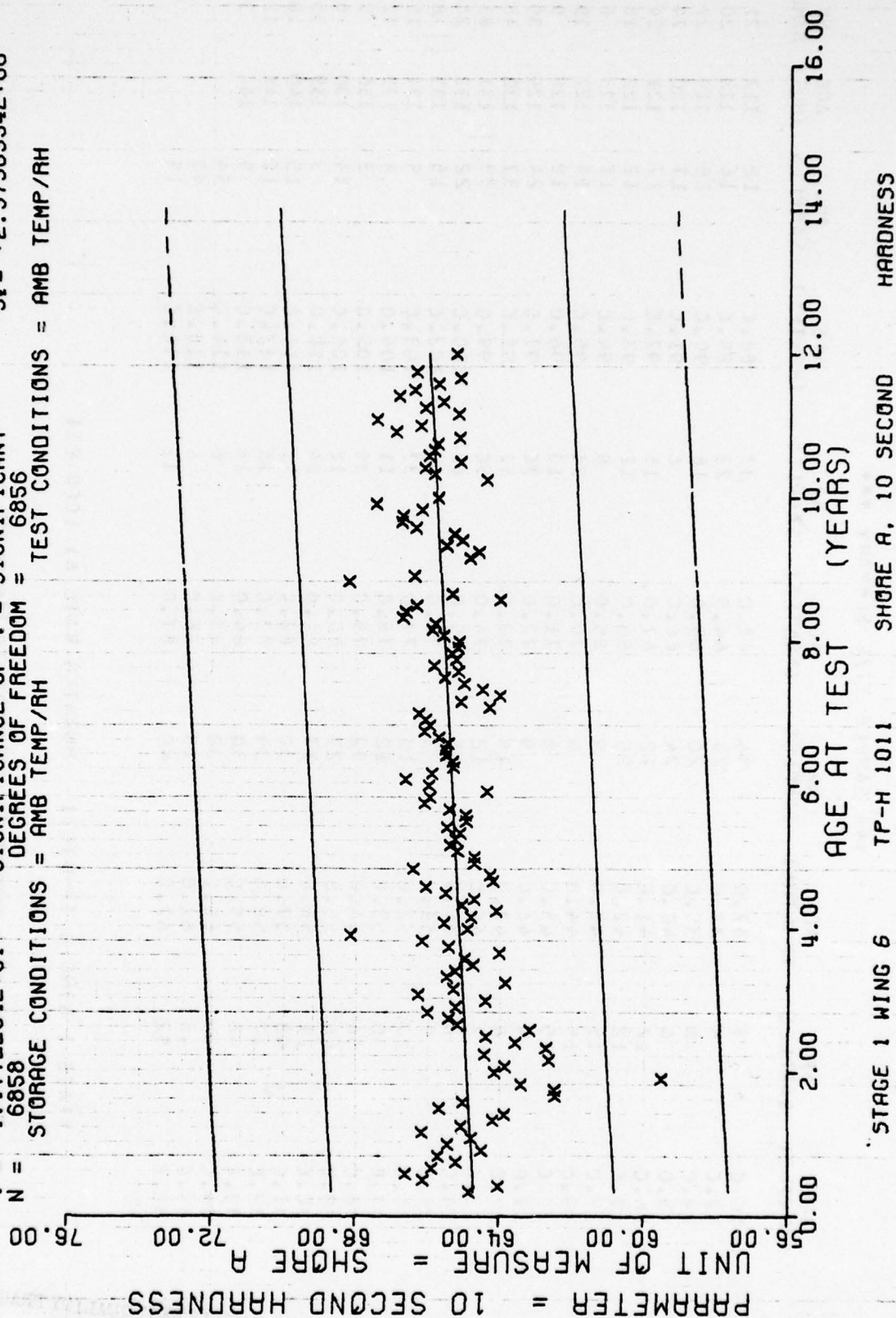
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STAGE	NAME	TP-H	1011	SECRET A, 10 SECOND	ADDRESS
1	...	...	...	...	...
2	...	...	...	...	...
3	...	...	...	...	...
4	...	...	...	...	...
5	...	...	...	...	...
6	...	...	...	...	...
7	...	...	...	...	...
8	...	...	...	...	...
9	...	...	...	...	...
10	...	...	...	...	...
11	...	...	...	...	...
12	...	...	...	...	...
13	...	...	...	...	...
14	...	...	...	...	...
15	...	...	...	...	...
16	...	...	...	...	...
17	...	...	...	...	...
18	...	...	...	...	...
19	...	...	...	...	...
20	...	...	...	...	...
21	...	...	...	...	...
22	...	...	...	...	...
23	...	...	...	...	...
24	...	...	...	...	...
25	...	...	...	...	...
26	...	...	...	...	...
27	...	...	...	...	...
28	...	...	...	...	...
29	...	...	...	...	...
30	...	...	...	...	...
31	...	...	...	...	...
32	...	...	...	...	...
33	...	...	...	...	...
34	...	...	...	...	...
35	...	...	...	...	...
36	...	...	...	...	...
37	...	...	...	...	...
38	...	...	...	...	...
39	...	...	...	...	...
40	...	...	...	...	...
41	...	...	...	...	...
42	...	...	...	...	...
43	...	...	...	...	...
44	...	...	...	...	...
45	...	...	...	...	...
46	...	...	...	...	...
47	...	...	...	...	...
48	...	...	...	...	...
49	...	...	...	...	...
50	...	...	...	...	...
51	...	...	...	...	...
52	...	...	...	...	...
53	...	...	...	...	...
54	...	...	...	...	...
55	...	...	...	...	...
56	...	...	...	...	...
57	...	...	...	...	...
58	...	...	...	...	...
59	...	...	...	...	...
60	...	...	...	...	...
61	...	...	...	...	...
62	...	...	...	...	...
63	...	...	...	...	...
64	...	...	...	...	...
65	...	...	...	...	...
66	...	...	...	...	...
67	...	...	...	...	...
68	...	...	...	...	...
69	...	...	...	...	...
70	...	...	...	...	...
71	...	...	...	...	...
72	...	...	...	...	...
73	...	...	...	...	...
74	...	...	...	...	...
75	...	...	...	...	...
76	...	...	...	...	...
77	...	...	...	...	...
78	...	...	...	...	...
79	...	...	...	...	...
80	...	...	...	...	...
81	...	...	...	...	...
82	...	...	...	...	...
83	...	...	...	...	...
84	...	...	...	...	...
85	...	...	...	...	...
86	...	...	...	...	...
87	...	...	...	...	...
88	...	...	...	...	...
89	...	...	...	...	...
90	...	...			

This sample size summary is applicable to figure 59

$Y = ((+6.4688319E+01) + (+9.1945893E-03) * X)$   
 $F = +1.3858691E+02$  SIGNIFICANCE OF F = SIGNIFICANT  $\sigma = +2.3973309E+00$   
 $R = +1.4076026E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_e = +7.8103629E-04$   
 $t = +1.1772294E+01$  SIGNIFICANCE OF t = SIGNIFICANT  $S_e = +2.3736354E+00$   
 $N = 6858$  DEGREES OF FREEDOM = 6856  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH





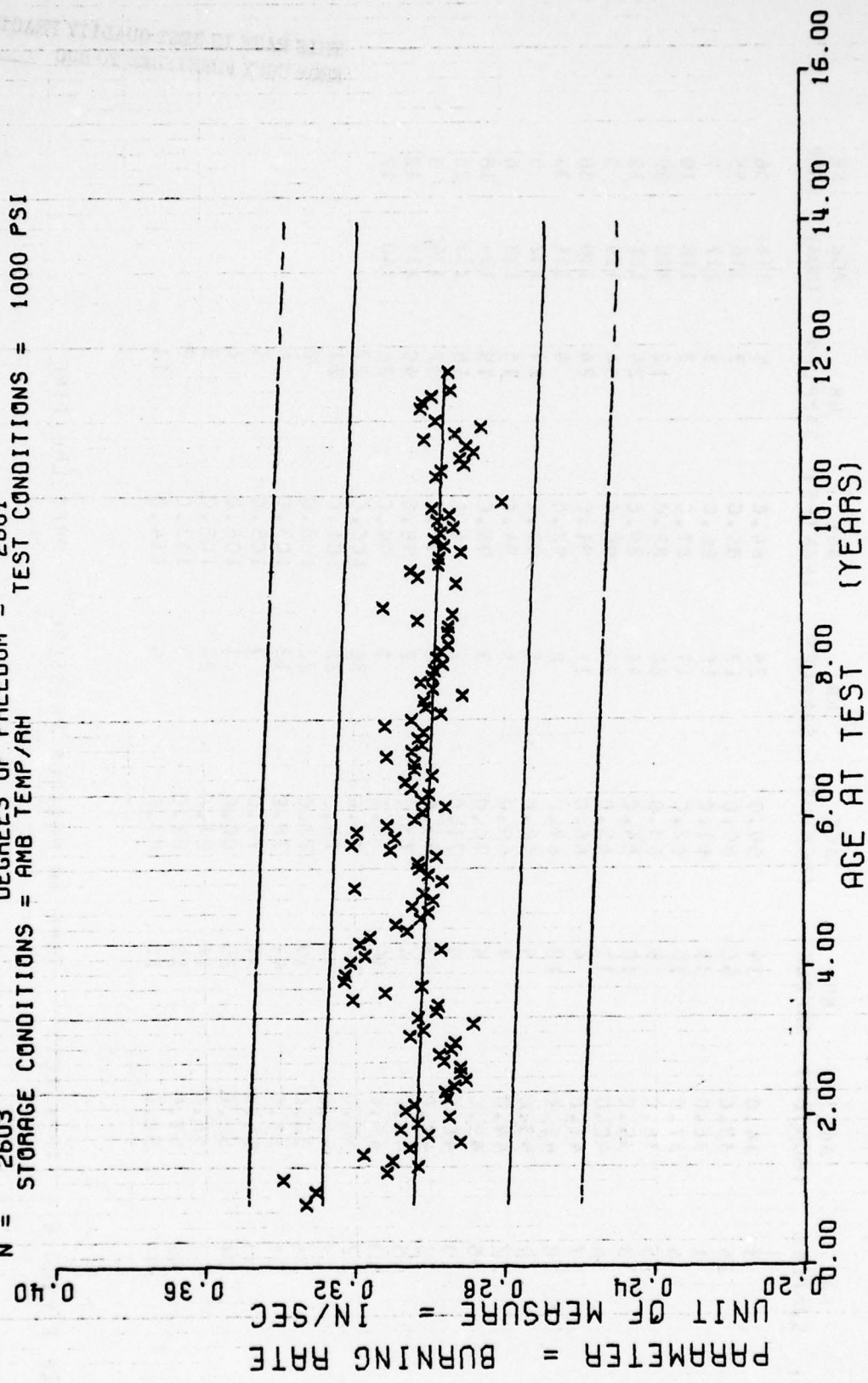
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STACE I WING 6 TP-HIC11 HURNING RATE AT 1CC0 PSI

This sample size summary is applicable to figure 60

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$Y = ((+3.0499257E-01) + (-7.4027421E-05) * X)$   
 SIGNIFICANCE OF F = SIGNIFICANT  
 SIGNIFICANCE OF R = SIGNIFICANT  
 SIGNIFICANCE OF t = SIGNIFICANT  
 DEGREES OF FREEDOM = 2601  
 N = 2603  
 STORAGE CONDITIONS = AMB TEMP/RH  
 TEST CONDITIONS = 1000 PSI



STAGE I WING 6 TP-H1011 BURNING RATE AT 1000 PSI

\*\*\* SAMPLE SIZE SUMMARY \*\*\*

STAGE 1 WIND 6	TP-T 1C11	TIME TO MAXIMUM PRESSURE	PRESSURE TIME
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15
16	16	16	16
17	17	17	17
18	18	18	18
19	19	19	19
20	20	20	20
21	21	21	21
22	22	22	22
23	23	23	23
24	24	24	24
25	25	25	25
26	26	26	26
27	27	27	27
28	28	28	28
29	29	29	29
30	30	30	30
31	31	31	31
32	32	32	32
33	33	33	33
34	34	34	34
35	35	35	35
36	36	36	36
37	37	37	37
38	38	38	38
39	39	39	39
40	40	40	40
41	41	41	41
42	42	42	42
43	43	43	43
44	44	44	44
45	45	45	45
46	46	46	46
47	47	47	47
48	48	48	48
49	49	49	49
50	50	50	50
51	51	51	51
52	52	52	52
53	53	53	53
54	54	54	54
55	55	55	55
56	56	56	56
57	57	57	57
58	58	58	58
59	59	59	59
60	60	60	60
61	61	61	61
62	62	62	62
63	63	63	63
64	64	64	64
65	65	65	65
66	66	66	66
67	67	67	67
68	68	68	68
69	69	69	69
70	70	70	70
71	71	71	71
72	72	72	72
73	73	73	73
74	74	74	74
75	75	75	75
76	76	76	76
77	77	77	77
78	78	78	78
79	79	79	79
80	80	80	80
81	81	81	81
82	82	82	82
83	83	83	83
84	84	84	84
85	85	85	85
86	86	86	86
87	87	87	87
88	88	88	88
89	89	89	89
90	90	90	90
91	91	91	91
92	92	92	92
93	93	93	93
94	94	94	94
95	95	95	95
96	96	96	96
97	97	97	97
98	98	98	98
99	99	99	99
100	100	100	100

This sample size summary is applicable to figures 61 and 62



$Y = (( +3.5983647E+03 ) + ( -1.4161747E-01 ) * X)$   
 $F = +5.9373170E+00$  SIGNIFICANCE OF F = SIGNIFICANT  $\sigma_r = +9.6927047E+01$   
 $R = -5.2441499E-02$  SIGNIFICANCE OF R = SIGNIFICANT  $S_b = +5.8119482E-02$   
 $t = +2.4366610E+00$  SIGNIFICANCE OF t = SIGNIFICANT  $S_t = +9.6816151E+01$   
 $N = 2153$  DEGREES OF FREEDOM = 2153  
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = 500 PSI INT PRES

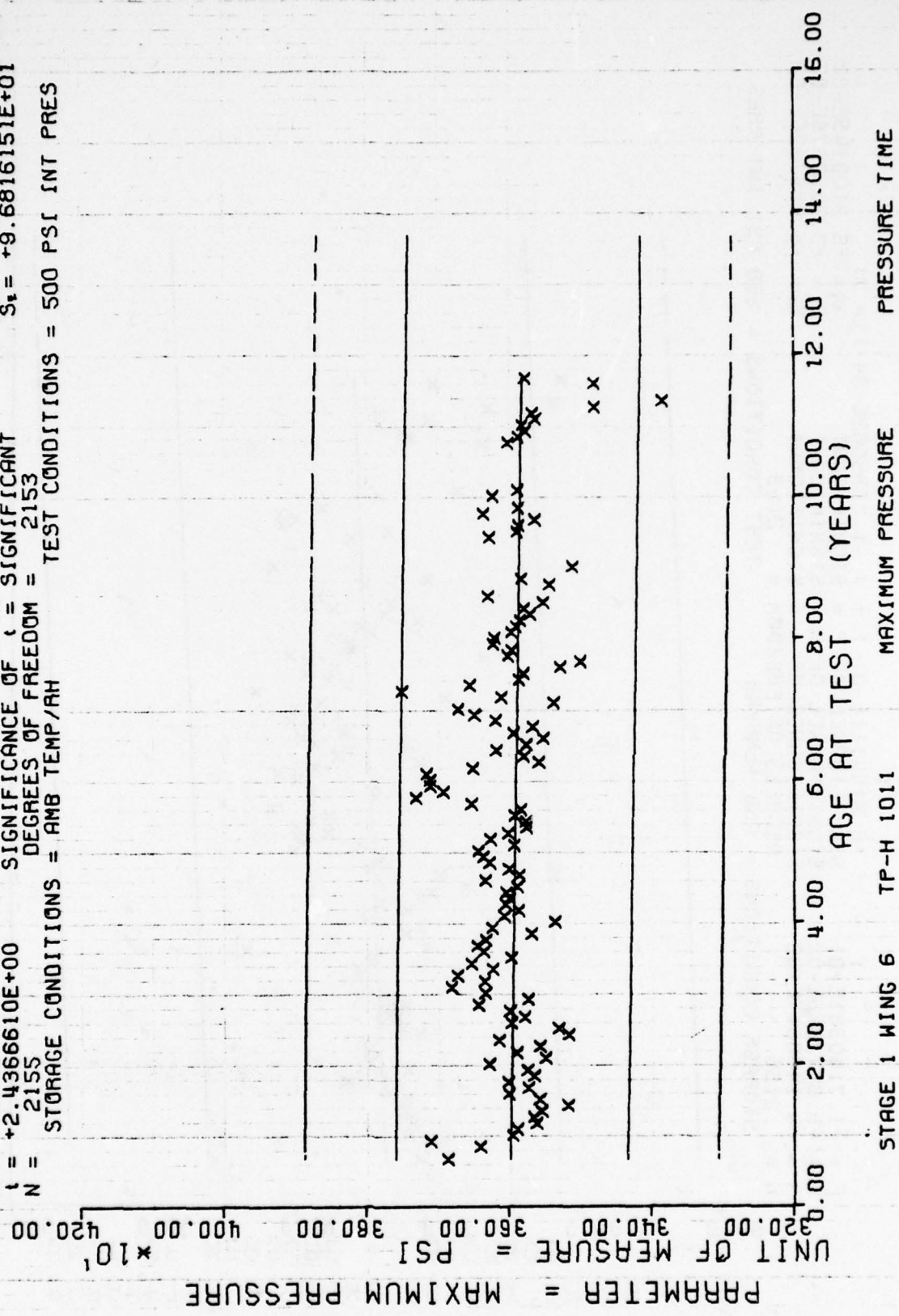
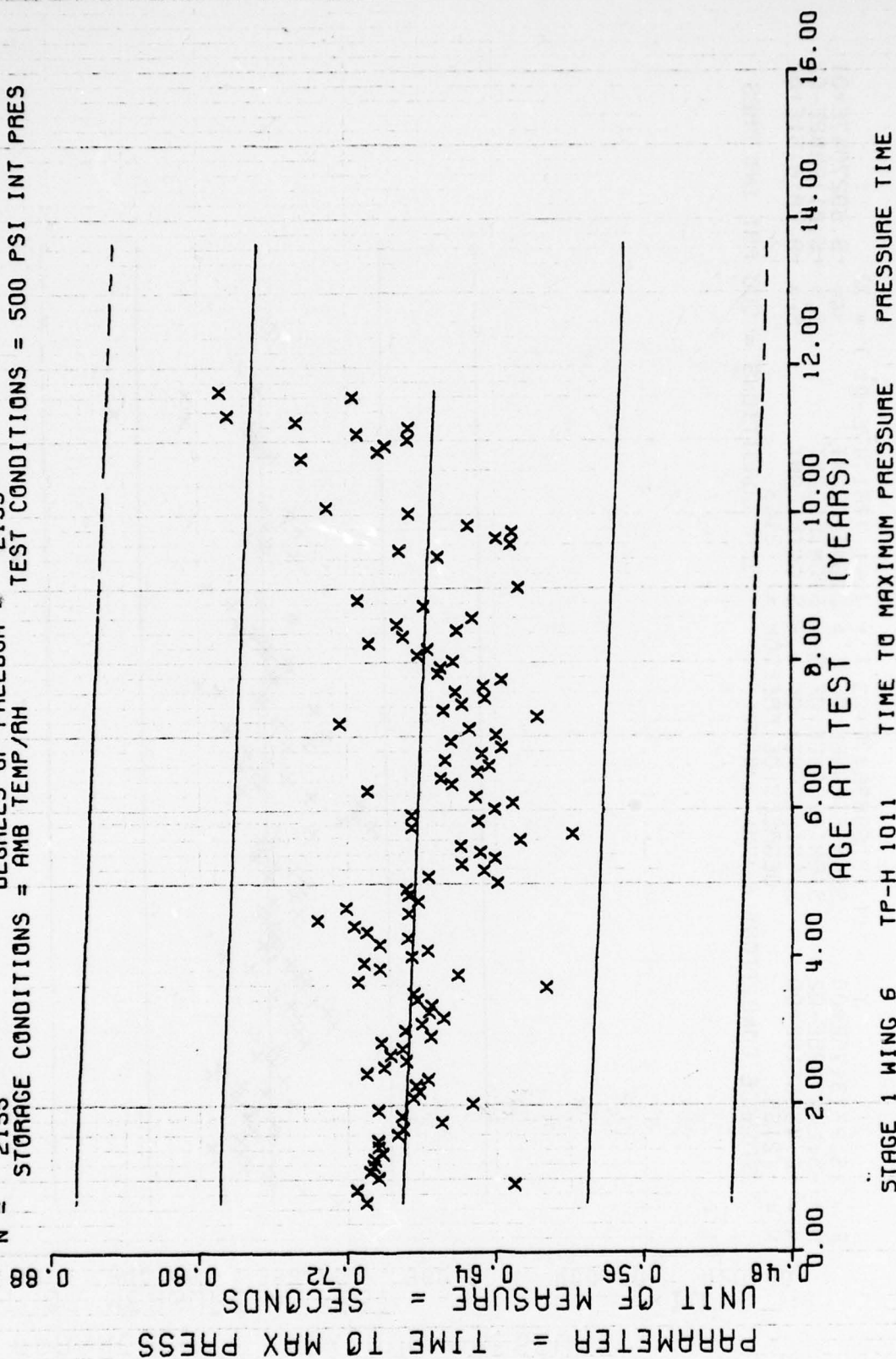


Figure 61

$Y = ((+6.914411E-01) + (-1.4635562E-04) * X)$   
 $F = +1.7140301E+01$  SIGNIFICANCE OF F = SIGNIFICANT  $\sigma_r = +5.9108143E-02$   
 $R = -8.8872076E-02$  SIGNIFICANCE OF R = SIGNIFICANT  $S_e = +3.5350876E-05$   
 $t = +4.1400847E+00$  SIGNIFICANCE OF t = SIGNIFICANT  $S_t = +5.8887926E-02$   
 $N = 2155$  DEGREES OF FREEDOM = 2153  
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = 500 PSI INT PRES



AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES
7.0	7	35.0	2	60.0	6	86.0	2	116	19
8.0	6	36.0	14	61.0	3	88.0	3	117	6
9.0	3	37.0	6	62.0	5	89.0	4	118	15
10.0	5	38.0	3	64.0	8	90.0	7	119	21
11.0	1	39.0	2	65.0	5	91.0	8	120	26
13.0	2	40.0	3	66.0	6	92.0	3	121	9
15.0	3	41.0	3	67.0	9	93.0	14	122	1
16.0	2	42.0	3	68.0	3	94.0	6	130	3
17.0	3	43.0	4	69.0	5	95.0	5	131	6

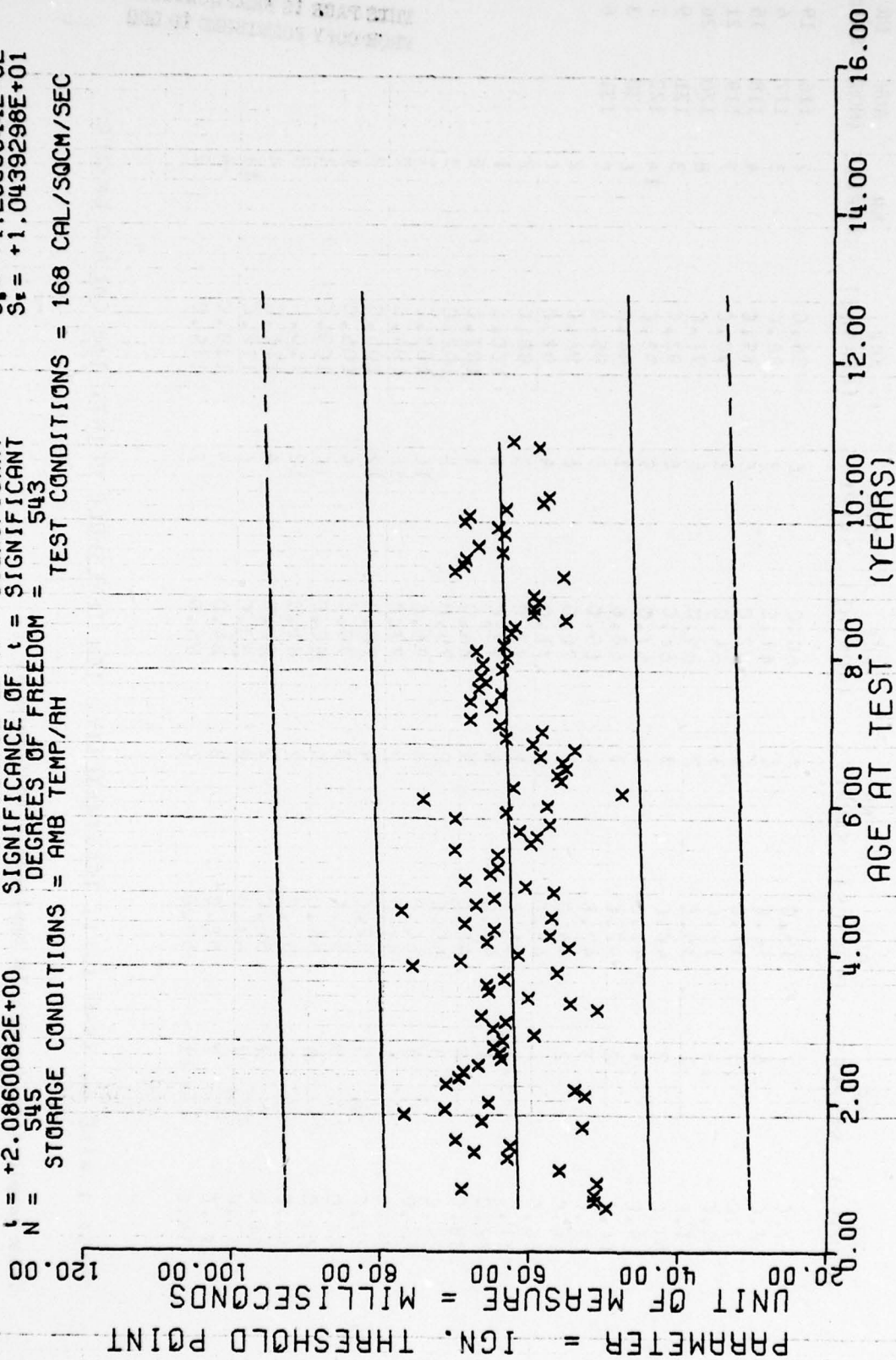
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STAGE 1 WING 6, TP-H 1011, IGNITABILITY, IGN THRESHOLD PCINT, 168 CAL/SQ CM/SEC

This sample size summary is applicable to figure 63



$Y = ((+6.1387015E+01) + (+2.6979481E-02) * X)$   
 $F = +4.3514306E+00$  SIGNIFICANCE OF  $F =$  SIGNIFICANT  $\sigma = +1.0471406E+01$   
 $R = +8.9162636E-02$  SIGNIFICANCE OF  $R =$  SIGNIFICANT  $S_e = +1.2933544E-02$   
 $t = +2.0860082E+00$  SIGNIFICANCE OF  $t =$  SIGNIFICANT  $S_t = +1.0439298E+01$   
 $N = 545$  DEGREES OF FREEDOM = 543  
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = 168 CAL/SQCM/SEC



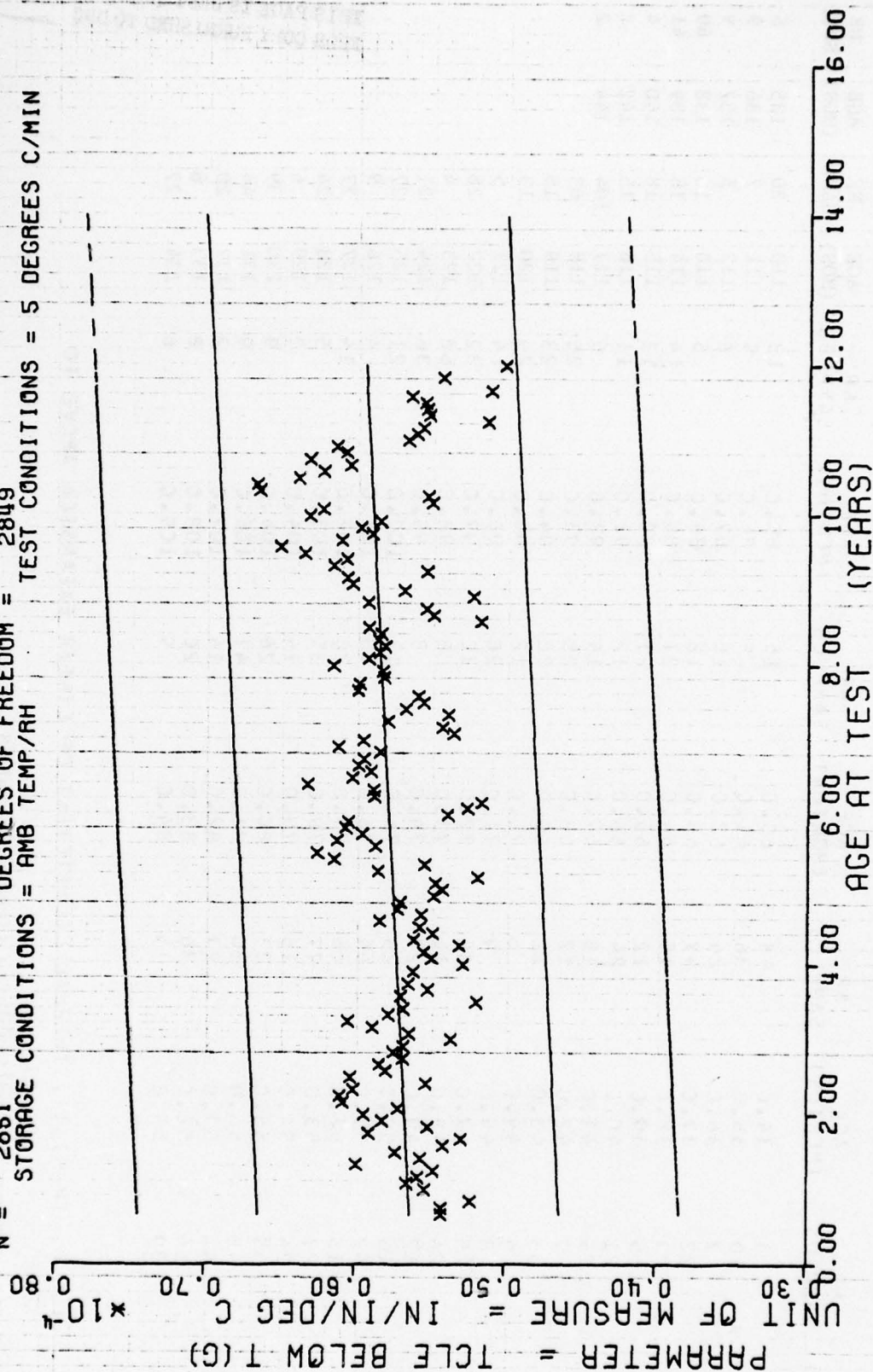
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STAGE 1, WING 6, TP-H1C11, THERMAL COEFFICIENT OF LINEAR EXPANSION ABOVE TG

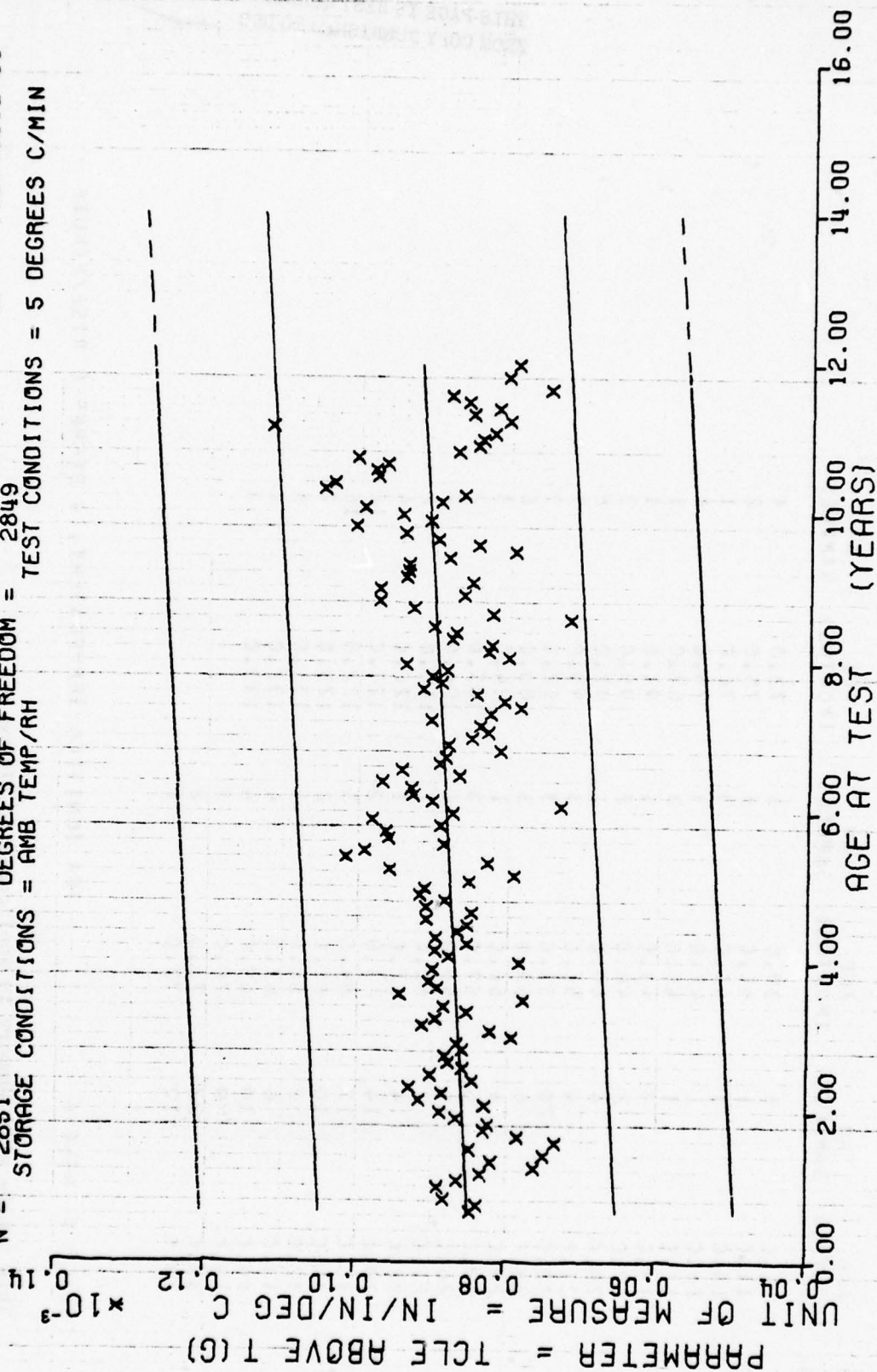
This sample size summary is applicable to figures 64 and 65

$Y = ((+5.6250688E-05) + (+2.3128001E-08) * X)$   
 $F = +6.2447050E+01$  SIGNIFICANCE OF F = SIGNIFICANT  $\sigma = +6.0862057E-06$   
 $R = +1.4645409E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_e = +2.9267265E-09$   
 $t = +7.9023446E+00$  SIGNIFICANCE OF t = SIGNIFICANT  $S_t = +6.0216375E-06$   
 $N = 2851$  DEGREES OF FREEDOM = 2849  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 5 DEGREES C/MIN





$F = +8.2702919E+01$   
 $R = +1.6795790E-01$   
 $t = +9.0941145E+00$   
 $N = 2851$   
 $Y = (( +8.4489664E-05 ) + ( +5.2488106E-08 ) * X)$   
 SIGNIFICANCE OF F = SIGNIFICANT  
 SIGNIFICANCE OF R = SIGNIFICANT  
 SIGNIFICANCE OF t = SIGNIFICANT  
 DEGREES OF FREEDOM = 2849  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 5 DEGREES C/MIN



STAGE 1, WING 6, TP-H1011, THERMAL COEFFICIENT OF LINEAR EXPANSION ABOVE TG

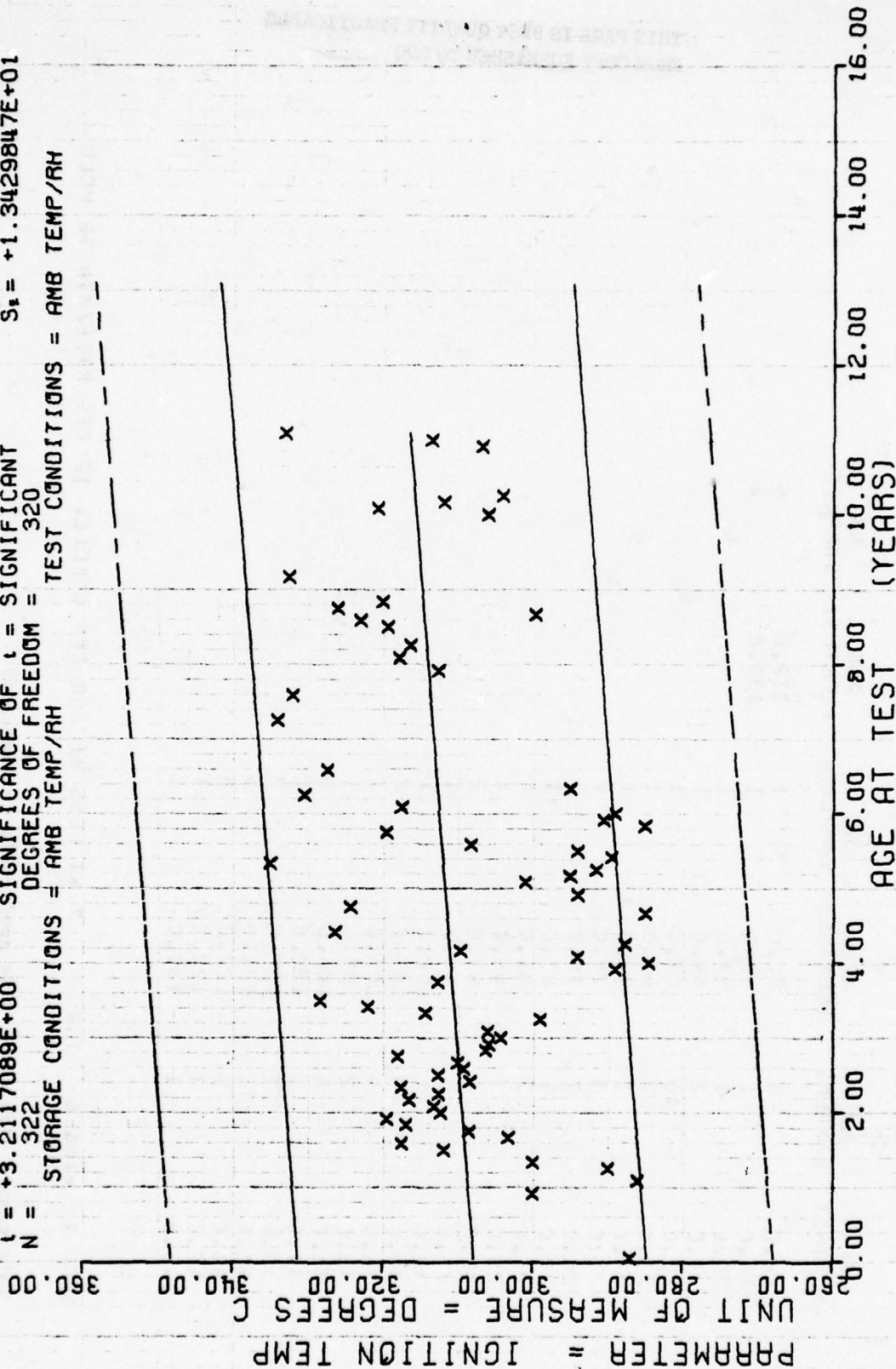
\*\*\* SAMPLE SIZE SUMMARY \*\*\*

AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES
1.C	3	39.0	3	73.0	4
11.C	1	40.C	3	75.0	2
13.C	1	41.C	3	76.C	1
15.C	1	42.0	3	79.0	6
16.C	1	45.C	3	87.0	1
18.C	7	47.C	1	91.C	1
19.C	2	48.0	2	95.0	2
20.C	4	49.0	1	97.0	6
21.C	4	50.C	3	99.0	3
22.C	20	51.C	3	102.0	3
23.C	4	53.0	3	103.0	6
24.C	4	56.C	1	104.0	3
25.C	6	57.0	3	105.0	2
26.C	14	59.0	1	106.0	2
27.C	2	61.C	1	110.0	2
28.C	4	62.C	1	120.C	4
29.C	14	63.0	2	121.C	10
30.C	12	64.C	3	122.0	16
31.C	10	65.C	2	123.C	2
32.C	2	66.C	1	131.C	4
33.C	6	67.0	4	132.0	8
34.C	10	69.C	4	133.C	3
35.C	9	70.C	1		
36.C	22	71.0	2		
37.C	12	72.0	1		

STAGE I WING 6 16A IGNITION TEMPERATURE, 9 DEGREE C RISE/MINUTE

This sample size summary is applicable to figure 66

$Y = (( +3.0797055E+02 ) + ( +6.4652611E-02 ) * X)$   
 $F = +1.0315074E+01$  SIGNIFICANCE OF F = SIGNIFICANT  $G = +1.3623313E+01$   
 $R = +1.7671442E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_0 = +2.0130283E-02$   
 $t = +3.2117089E+00$  SIGNIFICANCE OF t = SIGNIFICANT  $S_1 = +1.3429847E+01$   
 $N = 322$  DEGREES OF FREEDOM = 320  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = AMB TEMP/RH



STAGE I WING 6

TGA IGNITION TEMPERATURE, 9 DEGREE C RISE/MINUTE

Figure 66



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\*\*\* SAMPLE SIZE SUMMARY \*\*\*

AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES
18.C	3	50.C	1	132.C	4
19.C	1	53.0	1	133.C	2
20.C	1	57.C	1		
21.C	2	64.C	1		
22.C	10	67.C	1		
23.C	2	69.0	1		
24.C	2	73.C	1		
25.C	3	75.C	1		
26.C	7	79.C	2		
27.C	1	87.0	1		
28.C	2	91.C	1		
29.C	7	95.C	1		
30.0	6	97.0	2		
31.C	5	99.0	1		
32.C	1	102.C	1		
33.C	3	103.C	2		
34.0	4	104.0	1		
35.C	2	105.0	1		
36.C	6	106.C	1		
37.C	1	110.C	1		
39.0	1	120.C	2		
40.C	1	121.0	5		
41.C	1	122.C	8		
42.C	1	123.C	1		
45.0	1	131.C	2		

SAGE I WING 6 TGA 7 WT LCSS AT 250 DEG C HOLD, 12 DEG RISE/MIN TO HOLD 67-68

This sample size summary is applicable to figure 67

$F = +3.6463374E+01$   
 $R = -4.8429890E-01$   
 $t = +6.0384910E+00$   
 $N = 121$   
 $Y = ((+2.6615207E+01) + (-1.8902122E+02) / X)$   
 SIGNIFICANCE OF F = SIGNIFICANT  
 SIGNIFICANCE OF R = SIGNIFICANT  
 SIGNIFICANCE OF t = SIGNIFICANT  
 DEGREES OF FREEDOM = 119  
 STORAGE CONDITIONS = AMB TEMP/RH  
 TEST CONDITIONS = 12 DEG R/M TOHLD

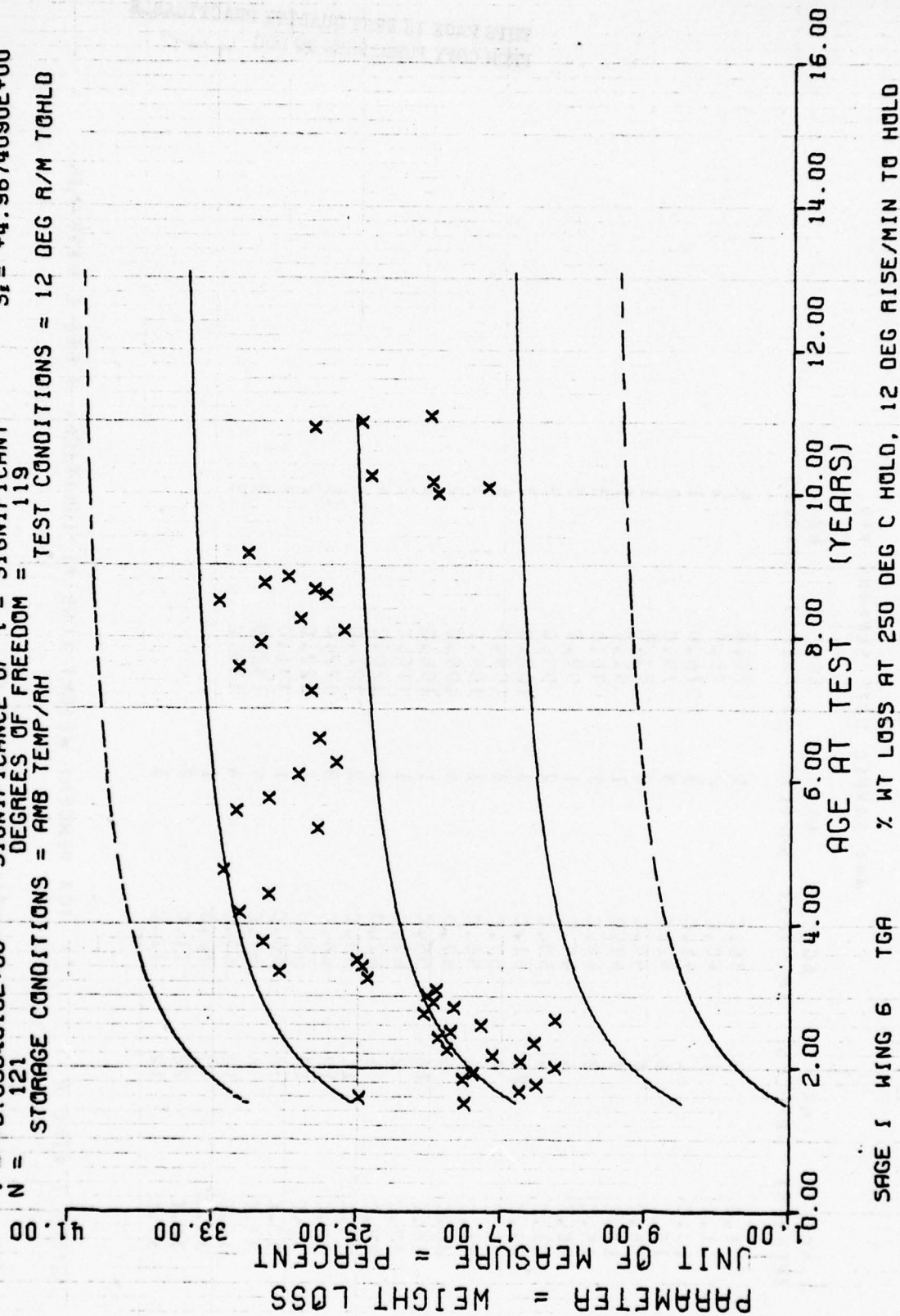


Figure 67

\*\*\* SAMPLE SIZE SUMMARY \*\*\*

AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES
1.C	3	39.C	1	73.0	4
11.C	1	40.C	2	75.0	2
13.C	1	41.C	3	76.0	1
15.C	1	42.C	3	79.0	6
16.C	1	45.0	2	87.0	1
18.C	7	47.0	1	91.0	1
19.C	2	48.0	2	95.0	3
20.C	4	49.C	1	97.0	5
21.C	4	50.0	2	99.0	2
22.C	20	51.0	3	102.0	3
23.C	4	53.0	3	103.0	5
24.C	4	56.0	1	104.0	1
25.C	6	57.0	3	105.0	2
26.C	14	59.C	1	106.0	2
27.C	2	61.0	1	110.0	2
28.C	4	62.0	1	120.0	4
29.C	14	63.0	2	121.0	10
30.C	12	64.0	3	122.0	10
31.C	10	65.0	2	123.0	2
32.C	2	66.0	1	131.0	4
33.C	6	67.0	4	132.0	8
34.C	10	69.0	4	133.0	3
35.C	3	70.0	1		
36.C	22	71.0	2		
37.C	12	72.0	1		

STAGE I WING 6 TGA PERCENT WEIGHT LOSS AT IGNITION, 9 DEG C RISE/MIN

This sample size summary is applicable to figure 68



$Y = ((+3.4776418E+01) + (-1.8157176E-02) * X)$   
 F = +2.5816251E+00 SIGNIFICANCE OF F = NOT SIGNIFICANT  $\sigma = +7.4606631E+00$   
 R = -9.0879279E-02 SIGNIFICANCE OF R = NOT SIGNIFICANT  $S_e = +1.1300605E-02$   
 t = +1.6067436E+00 SIGNIFICANCE OF t = NOT SIGNIFICANT  $S_t = +7.4417641E+00$   
 N = 312 DEGREES OF FREEDOM = 310  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 9 DEG C RISE/MIN

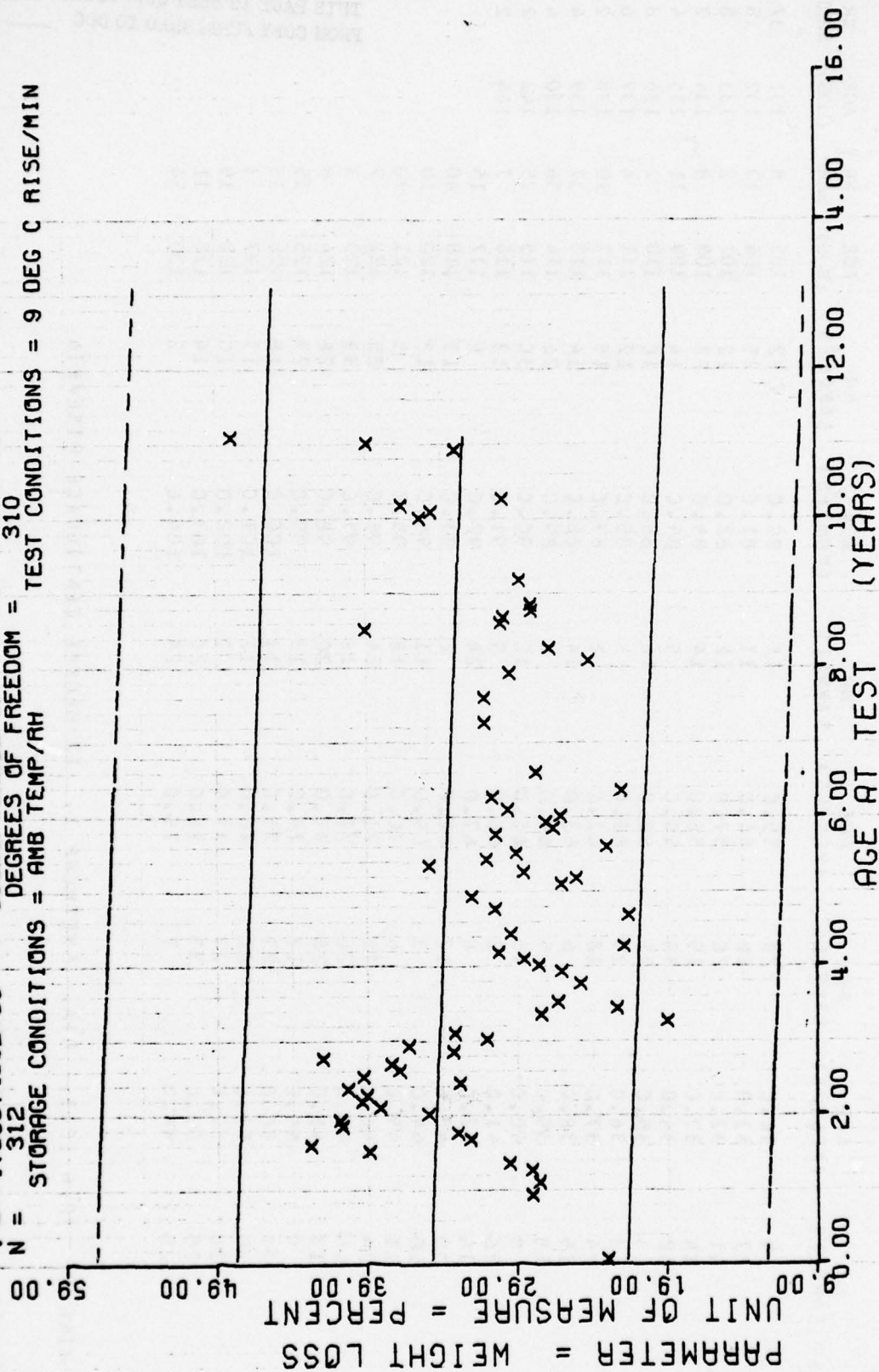


Figure 68

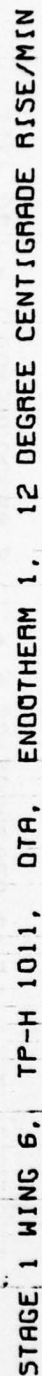
AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES
5.0	9	30.0	29	55.0	15	80.0	32	105	8	131	37				
6.0	27	31.0	28	56.0	11	81.0	25	106	13	132	18				
7.0	11	32.0	20	57.0	12	82.0	22	107	2	133	8				
8.0	14	33.0	19	58.0	14	83.0	27	108	8	134	2				
9.0	12	34.0	33	59.0	9	84.0	14	109	11	135	4				
10.0	3	35.0	21	60.0	16	85.0	10	110	2	136	8				
11.0	3	36.0	29	61.0	8	86.0	12	111	6	137	6				
12.0	24	37.0	18	62.0	8	87.0	15	112	10	138	2				
13.0	15	38.0	6	63.0	14	88.0	14	113	37	139	4				
14.0	18	39.0	5	64.0	6	89.0	26	114	56	140	4				
15.0	8	40.0	15	65.0	10	90.0	30	115	25	142	2				
16.0	26	41.0	2	66.0	9	91.0	13	116	7	144	2				

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STAGE 1 WING 6, TP-H 1C11, CTA, EXCTHERM 1, 12 DEGREE CENTIGRADE RISE/MIN

This sample size summary is applicable to figures 69 and 70

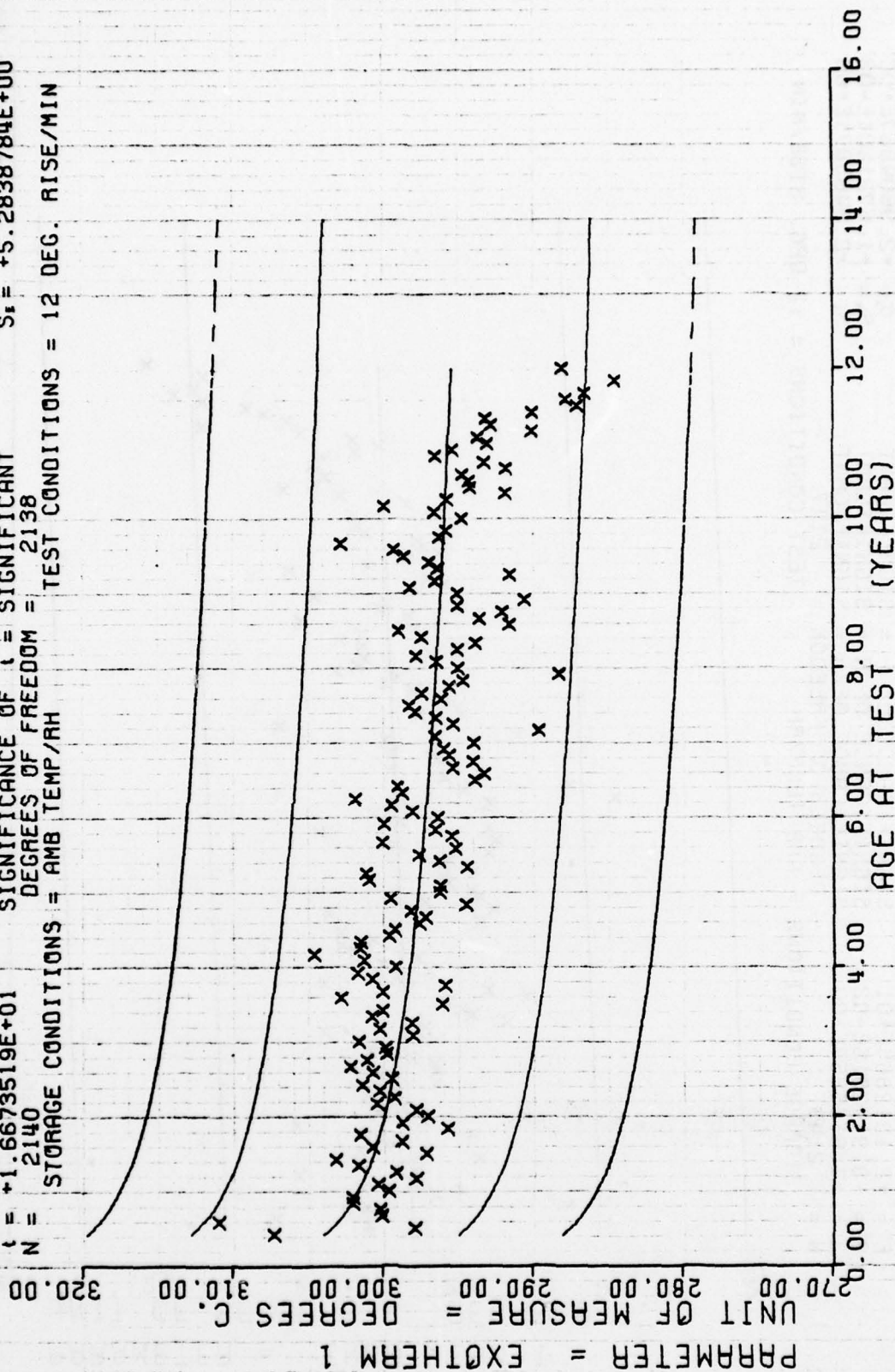
PARAMETER = ENDOTHERM 1	UNIT OF MEASURE = DEGREES C.	
236.00	244.00	252.00



- 105 -



$Y = ((+3.0792850E+02) + (-5.8522274E+00) \times \text{LOG}(X))$   
 $F = +2.7800624E+02$  SIGNIFICANCE OF F = SIGNIFICANT  $\sigma_f = +5.6156037E+00$   
 $R = -3.3921750E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_e = +3.5098933E-01$   
 $t = +1.6673519E+01$  SIGNIFICANCE OF t = SIGNIFICANT  $S_e = +5.2838784E+00$   
 $N = 2140$  DEGREES OF FREEDOM = 2138  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 12 DEG. RISE/MIN



STAGE 1 WING 6, TP-H 1011, DTA, EXOTHERM 1, 12 DEGREE CENTIGRADE RISE/MIN

Figure 70

AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES
8.C	3	34.C	26	59.0	9	84.C	13	109	11												
9.C	5	35.C	18	60.0	15	85.C	9	110	2												
10.C	3	36.C	24	61.0	8	86.C	12	111	6												
12.C	17	37.C	14	62.0	8	87.C	15	112	8												
13.C	10	38.C	4	63.0	13	88.0	14	113	35												
14.C	9	39.C	3	64.0	6	89.C	26	114	55												
15.C	5	40.0	13	65.0	9	90.C	29	115	22												
16.C	19	41.0	2	66.0	9	91.0	13	116	5												
17.C	14	42.C	8	67.C	22	92.0	7	117	15												
18.C	18	43.0	10	68.0	8	93.C	12	118	40												
19.C	4	44.0	3	69.0	10	94.0	12	120	8												
20.C	11	45.C	6	70.C	12	95.C	4	121	10												
21.0	22	46.0	9	71.0	23	96.C	22	122	7												
22.C	13	47.C	21	72.0	15	97.C	26	123	3												
23.C	10	48.C	20	73.0	16	98.C	27	124	8												
24.0	9	49.0	9	74.C	13	99.C	25	125	15												
25.0	20	50.0	11	75.0	11	100.C	14	126	15												
26.C	16	51.0	14	76.0	12	101.0	10	127	3												
27.0	12	52.0	18	77.0	9	102.C	10	128	16												
28.0	19	53.0	25	78.C	15	103.C	13	129	10												
29.C	13	54.0	7	79.0	24	104.0	2	130	44												
30.C	22	55.C	15	80.C	32	105.0	7	131	35												
31.0	21	56.0	10	81.0	25	106.C	13	132	17												
32.C	20	57.C	11	82.0	22	107.C	2	133	7												
33.C	11	58.C	14	83.0	24	108.0	8	134	2												
								135	4												
								136	8												
								137	6												
								138	2												
								139	4												
								140	4												
								142	1												
								144	2												

PAGE 1 WING 6, TP-H 1011, CIA, EXCITERM 2, 12 DEGREE CENTIGRADE RISE/MIN

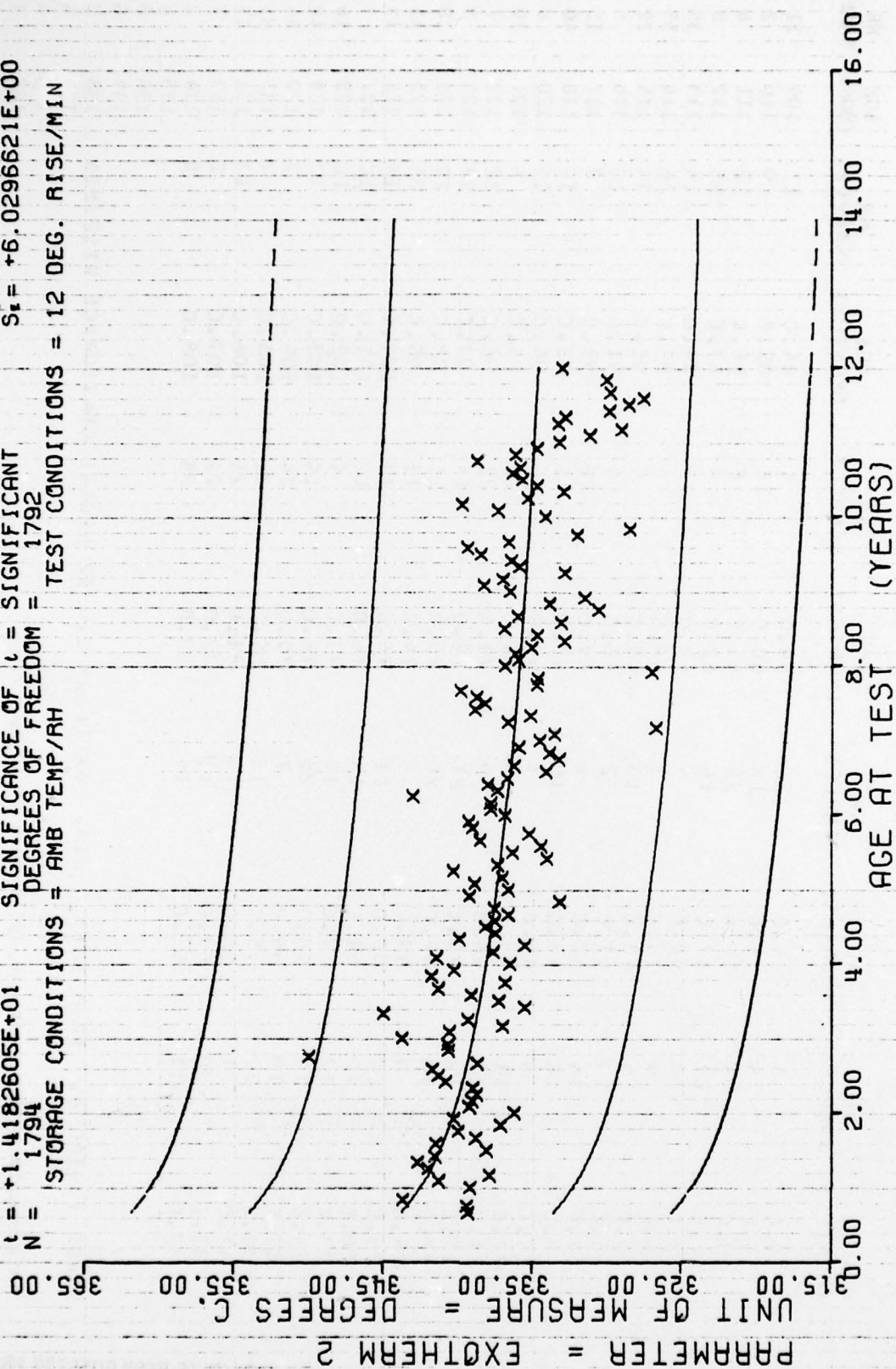
This sample size summary is applicable to figure 71

STAGE 1 WING 6, TP-H 1011, CTA, EXOTHERM 2, 12 DEGREE CENTIGRADE RISE/MIN

This sample size summary is applicable to figure 71

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$Y = ((+3.5041425E+02) + (-7.3656276E+00) \times \text{LOG}(X))$   
 $F = +2.0114630E+02$  SIGNIFICANCE OF F = SIGNIFICANT  $\sigma = +6.3572958E+00$   
 $R = -3.1767748E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_e = +5.1934234E-01$   
 $t = +1.4182605E+01$  SIGNIFICANCE OF t = SIGNIFICANT  $S_e = +6.0296621E+00$   
 $N = 1794$  DEGREES OF FREEDOM = 1792  
 STORAGE CONDITIONS = AMB TEMP/AM TEST CONDITIONS = 12 DEG. RISE/MIN



STAGE 1 WING 6, TP-H 1011, OTA, EXOTHERM 2, 12 DEGREE CENTIGRADE RISE/MIN

Figure 71



\*\*\* SAMPLE SIZE SUMMARY \*\*\*

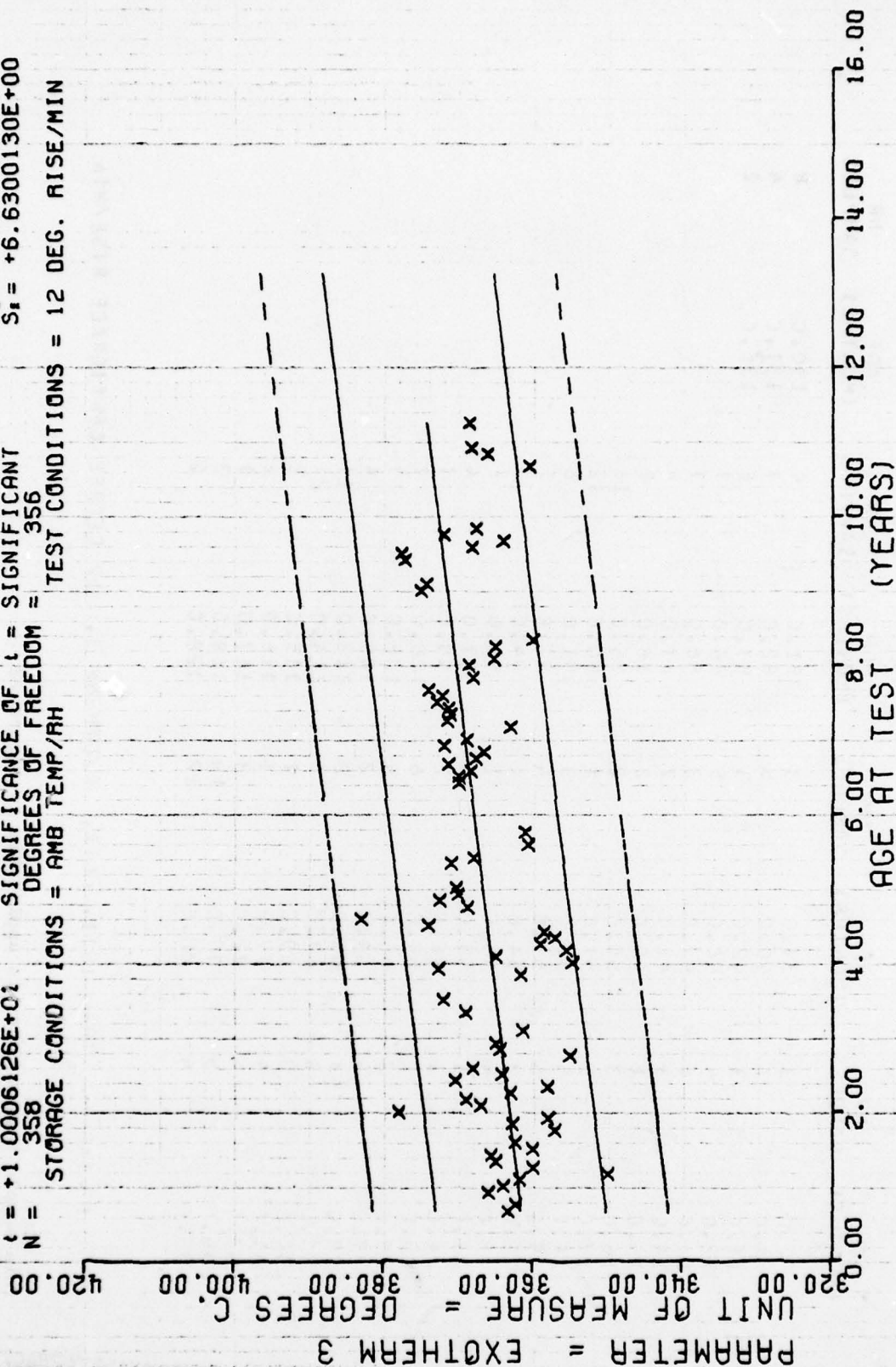
AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES	AGE (MONTHS)	NR SAMPLES
2.C	3	37.C	3	81.C	5	130.C	8
5.C	7	40.C	5	82.C	7	131.C	4
11.C	3	42.C	3	83.C	8	135.C	2
12.C	4	46.C	5	84.C	7		
13.C	5	47.C	3	86.C	1		
14.C	3	48.C	7	87.C	6		
15.C	1	49.C	2	88.C	8		
16.C	3	50.C	2	89.C	16		
17.C	5	51.C	1	90.C	12		
18.C	5	52.C	3	91.C	6		
19.C	6	53.C	4	92.C	2		
21.C	2	54.C	1	94.C	2		
22.C	4	55.C	1	96.C	6		
23.C	1	57.C	5	97.C	4		
24.C	1	58.C	2	99.C	1		
25.C	1	59.C	6	100.C	1		
26.C	2	60.C	4	108.C	3		
27.C	4	64.C	2	109.C	4		
28.C	3	65.C	2	113.C	11		
29.C	5	67.C	6	114.C	21		
30.C	9	69.C	1	115.C	5		
31.C	4	77.C	1	116.C	2		
33.C	4	78.C	3	117.C	1		
34.C	5	75.C	18	118.C	3		
35.C	4	80.C	12	128.C	2		

STAGE 1 WING 6, IP-W 1011, CIA, EXCIHERN 3, 12 DEGREE CENTIGRADE RISE/MIN

This sample size summary is applicable to figure 72

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$Y = ((+3.6082876E+02) + (+1.0010188E-01) * X)$   
 $F = +1.0012256E+02$  SIGNIFICANCE OF F = SIGNIFICANT  
 $R = +4.6851684E-01$  SIGNIFICANCE OF R = SIGNIFICANT  
 $t = +1.0006126E+01$  SIGNIFICANCE OF t = SIGNIFICANT  
 $N = 358$  DEGREES OF FREEDOM = 356  
 STORAGE CONDITIONS = AMB TEMP/RH TEST CONDITIONS = 12 DEG. RISE/MIN



STAGE 1 WING 6, TP-H 1011, DTA, EXOTHERM 3, 12 DEGREE CENTIGRADE RISE/MIN

Figure 72

[illegible]

STAGE 1 WING 6, TP-H 1011, CTA, IGNITION TEMPERATURE, 12 DEGREE CENT. RISE/MIN

This sample size summary is applicable to figure 73

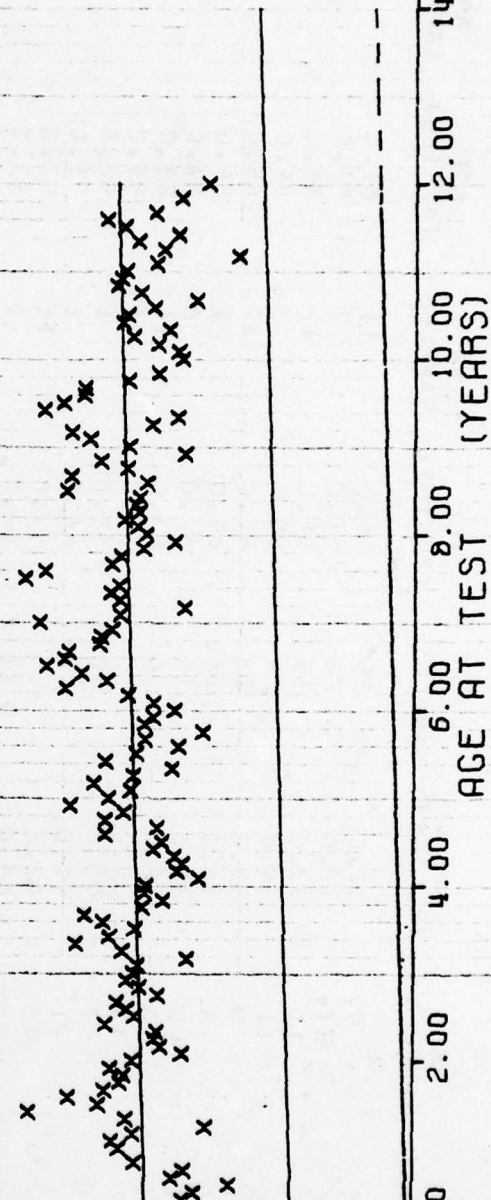
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PARAMETER = IGNITION TEMPERATURE

UNIT OF MEASURE = DEGREES C.

Y = (( +3.7037862E+02 ) + ( +2.4479745E-02 ) \* X )  
 F = +1.5648592E+01 SIGNIFICANCE OF F = SIGNIFICANT  $\sigma_r = +1.0045584E+01$   
 R = +9.4035994E-02 SIGNIFICANCE OF R = SIGNIFICANT  $S_e = +6.1882700E-03$   
 t = +3.9558302E+00 SIGNIFICANCE OF t = SIGNIFICANT  $S_t = +1.0003921E+01$   
 N = 1756 DEGREES OF FREEDOM = 1754  
 STORAGE CONDITIONS = AMB TEMP/AH TEST CONDITIONS = 12 DEG. RISE/MIN



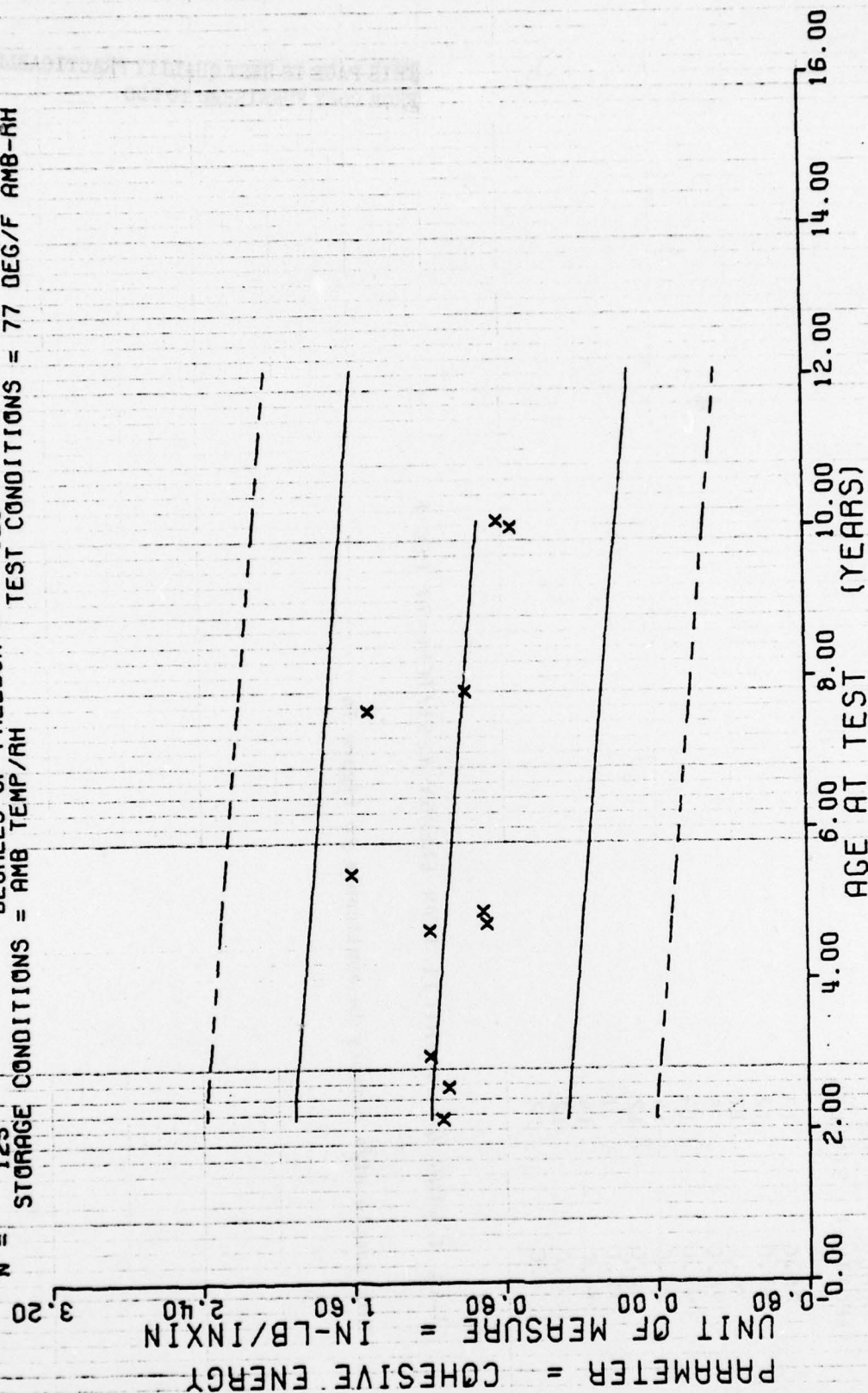
\*\*\* SAMPLE SIZE SUMMARY \*\*\*

AGE (MONTHS)	NR SAMPLES
26.C	13
31.C	12
36.C	11
56.C	5
57.C	13
59.C	14
65.C	12
91.C	7
94.C	14
120.C	12
121.C	12

STAGE I WING 6 TP-HIC11 TEAR ENERGY TEST/TEMP=77 DEG F

This sample size summary is applicable to figure 74

$Y = ((+1.2718053E+00) + (-2.9404487E-03) * X)$   
 $F = +7.3959993E+00$  SIGNIFICANCE OF F = SIGNIFICANT  $G = +4.0501268E-01$   
 $R = -2.3815861E-01$  SIGNIFICANCE OF R = SIGNIFICANT  $S_0 = +1.0812227E-03$   
 $t = +2.7195586E+00$  SIGNIFICANCE OF t = SIGNIFICANT  $S_t = +3.9495474E-01$   
 $N = 125$  DEGREES OF FREEDOM = 123  
 STORAGE CONDITIONS = AMB TEMP/77 TEST CONDITIONS = 77 DEG/F AMB-RH

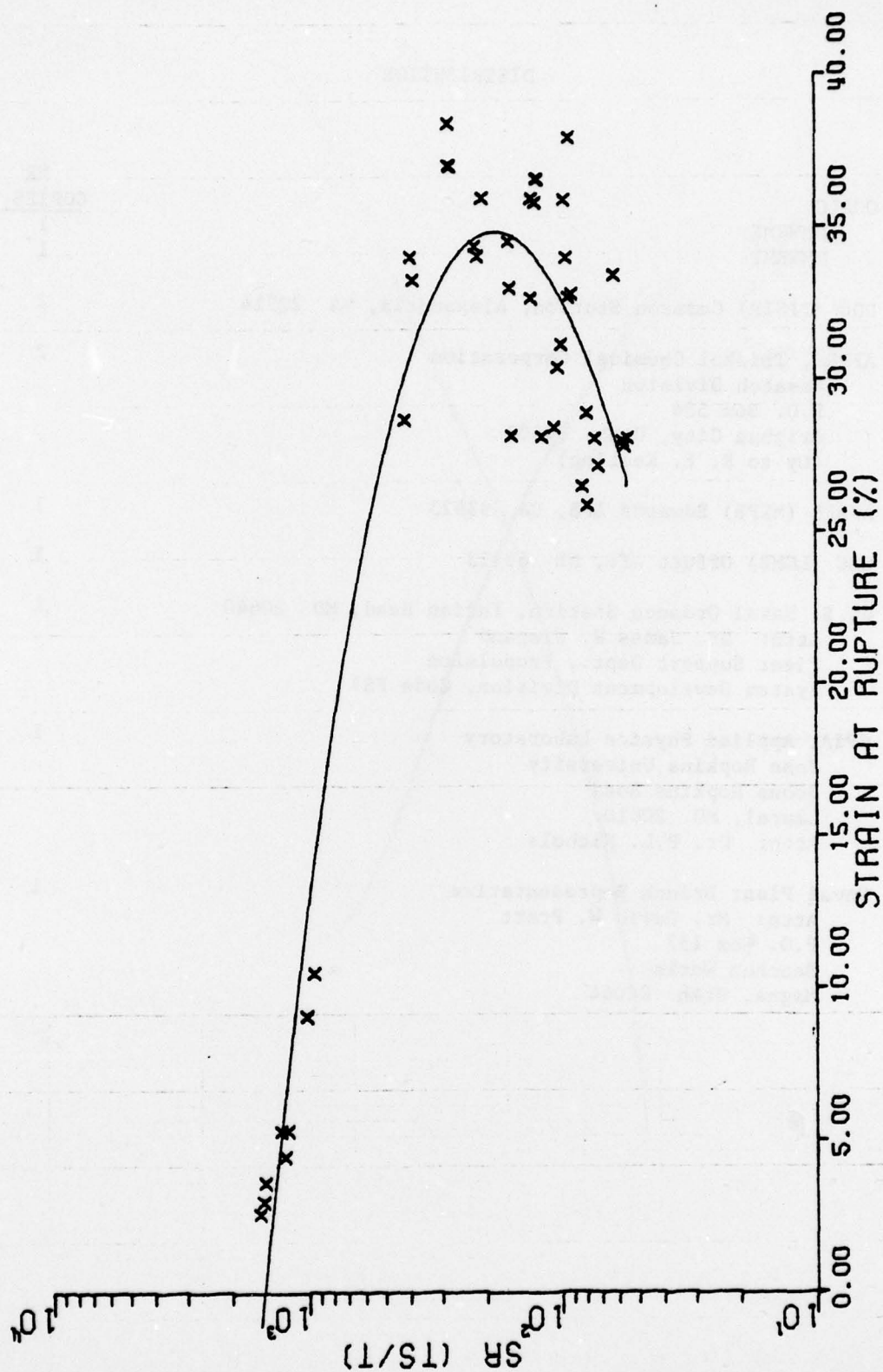


STAGE I WING 6 TP-H1011 TEAR ENERGY TEST/TEMP=77 DEG F

Figure 74



# TEMPERATURE CORRECTED FAILURE ENVELOPE



FAILURE ENVELOPE (MOTOR/SN 0013670) STAGE 1, WING 6, TP-H1011

Figure 75

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↓  
F and G), significant degradation of the propellant does not appear likely for at least two years past the oldest data point.

Each point on the regression plot represents the mean of all samples at that particular age. The number of samples at each point is indicated on the sample size summary sheet on the page accompanying each regression plot or group of regression plots. The data range at any age can be found by suitable inquiry of the G085 system. ↙



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		6. PERFORMING ORG. REPORT NUMBER
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